

Technical guide



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Design and operation

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1.1 Product information and operating conditions

Vitogas 100 (type GS1)

Low-temperature gas-fired boiler

Rated output 72 to 144 kW, as multi-boiler system up to 432 kW

Available as block or in single sections

For operation with modulating boiler water temperature

With two-stage pre-mix burner for natural gas and LPG

Fully automatic

Permissible flow temperature
(= safety temperature) up to 110 °C

Maximum operating pressure 6 bar

Product ID
CE-0085 AS 0297

- High operational safety and long service life because of heating surfaces made from special cast iron with lamellar graphite and low stresses on the heating surface.
- Economical energy consumption through modulating boiler water temperature.
Standard efficiency: up to 93 %.
- Highly reliable and gentle, low-noise ignition through intermittent ignition system.

- Matching flue gas header made from stainless steel for cascade operation with up to three Vitogas 100 boilers.
 - Flexible boiler location.
 - Variable flue gas collector installation
 - Sliding adapter for simple offset compensation
 - Excellent flow characteristics on the flue gas side because of continuous, circular cross-section.
- Weather-compensated digital cascade control unit Vitotronic 333, capable of communicating:
 - three boilers can be joined with Vitotronic 100.
 - up to 32 Vitotronic 050 control units can be connected.
 - integration into building management systems via LON BUS.

Operating conditions

	Requirements	Fulfilled by
1. Heating water flow rate	None	—
2. Boiler return temperature (minimum value)	35 °C	Installation of an effective return temperature raising facility ^{*1}
3. Lower boiler water temperature	45 °C	The Viessmann control unit, which is part of the standard delivery
4. Two stage burner operation	1st stage 65 % of rated output	Burner adjusted in the factory
5. Reduced operation	Single boiler systems and lead boiler of multi-boiler systems – operation with the lower boiler water temperature Lag boiler of multi-boiler systems – are switched off	The Viessmann control unit, which is part of the standard delivery
6. Weekend reduction	As per reduced operation	As per reduced operation

^{*1}As per application examples from page 14.

► **Please note:**

For water quality requirements, see page 13.

1.2 Boiler control units

1.2 Boiler control units and control panels

(for a comprehensive description, see data sheets boiler control units)

The following control units are available for Vitogas 100 boilers:

For the operation of single boiler systems

Vitotronic 100 (type KC2)

- electronic boiler control unit for constant boiler water temperature or weather-compensated operation, in conjunction with an external control unit
- for **two-stage burners**
- with DHW cylinder temperature control

(According to the Heating System Orders, a weather-compensated or room temperature-dependent control unit with timer programming must be installed for reduced operation.)

External commands:

- 1st burner stage ON
- 1st and 2nd burner stage ON

A volt-free contact must be provided for each command.

The volt-free contacts are connected to plug connector [150] and to the cable for the 2nd burner stage at plug connector [90].

Vitotronic 200 (type KW2)

- weather-compensated, digital boiler control unit
- for **single boiler systems**
- for **two-stage burners**
- incl. digital timer with daily and weekly programs
- with plain text guided programming unit
- with separately adjustable periods
- with DHW cylinder temperature control
- with integrated diagnostic system.

Vitotronic 300 (type GW2)

- weather-compensated, digital boiler control unit
- for **single boiler systems**
- for **max. 2 heating circuits with mixer**
- for **two-stage burners**
- with plain text guided programming unit
- with separately adjustable periods and heating curves
- with DHW cylinder temperature control
- incl. control unit for cylinder loading systems with regulated 3-way valve or as alternative to regulating a constant return temperature with regulated 3-way valve
- with integrated diagnostic system and additional functions.

An extension kit is required for **each heating circuit with mixer**. The LON communication module is required for **LON BUS communication**.

For the operation of multi-boiler systems

Multi-boiler systems are delivered complete, comprising:

- 2 or 3 Vitogas 100
- 2 or 3 Vitotronic 100 (type GC1)
- 2 or 3 communication modules LON
- 1 Vitotronic 333 (type MW1)

Every boiler in a multi-boiler system is equipped with Vitotronic 100 (type GC1). Vitotronic 333 (type MW1) is part of the standard delivery (see price list) and must be installed separately.

The LON communication module must be fitted into Vitotronic 100, see price list.

In multi-boiler systems with external control unit, the load-dependent burner and boiler control as well as the DHW cylinder temperature control must be implemented by the overriding (external) control unit.
(On request)

Control panels

Vitocontrol control panels with weather-compensated control unit Vitotronic 333 (type MW1S) for 1 to 3 boilers and 2 heating circuits with mixers and additional Vitotronic 050, types HK1S or HK3S for 1 or up to 3 heating circuits with mixers can be supplied for all Vitogas 100.

External commands in conjunction with Vitotronic 100 (type KC2) and external weather-compensated control unit with DHW cylinder temperature control:

- enable boiler
- 1st burner stage ON
- 1st and 2nd burner stage ON

A volt-free contact must be provided for each command.

The volt-free contacts are connected to plug connector [150] and to the cable for the 2nd burner stage at plug connector [90].

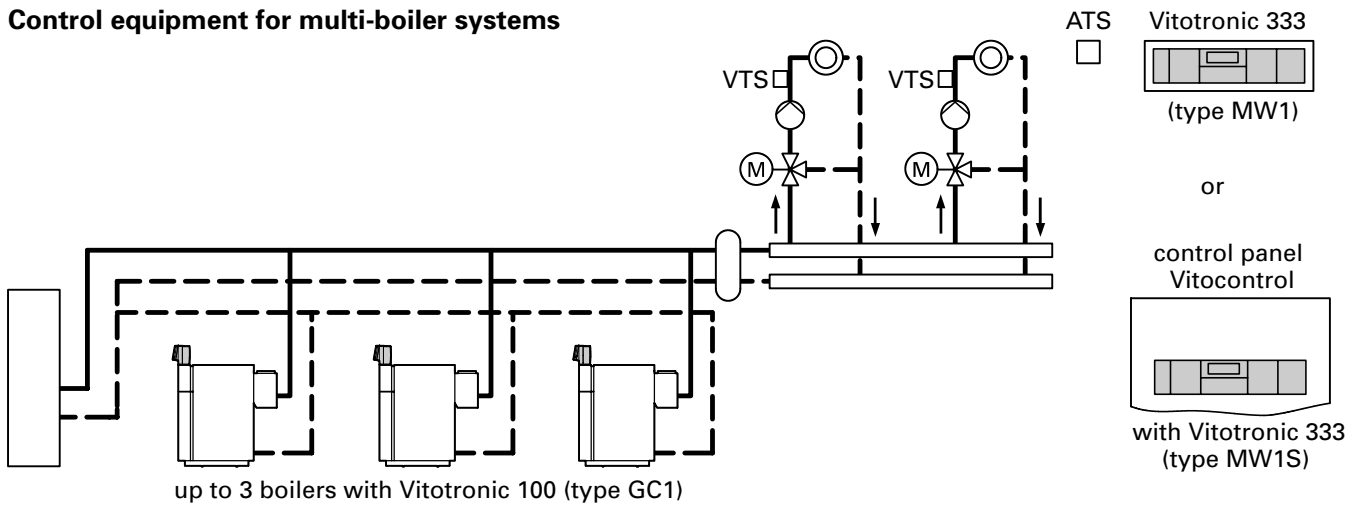
Vitotronic 100 (type GC1)

- Electronic boiler control unit
- for **two-stage burners**
- ability to communicate via LON BUS.

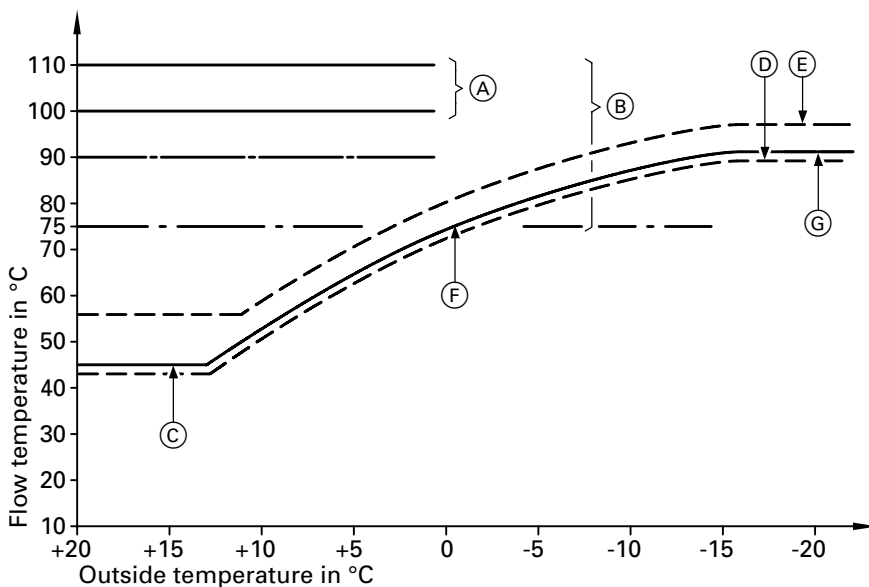
Vitotronic 333 (type MW1)

- Weather-compensated cascade control unit for multi-boiler systems with up to 3 boilers with Vitotronic 100. (Type GC1)
- for **max. 2 heating circuits with mixer**
- with plain text guided programming unit
- with DHW cylinder temperature control
- incl. control unit for cylinder loading systems with regulated 3-way valve
- with sequential boiler strategy
- ability to communicate via LON BUS.
- with integrated diagnostic system and additional functions.

Control equipment for multi-boiler systems



Switching points



- (A) Setting options for the high limit safety cut-out of the Vitotronic boiler control unit (change the high limit safety cut-out setting to 110 °C)
- (B) Setting options for the control thermostat of the Vitotronic boiler control unit
- (C) Lower boiler water temperature (45 °C)
- (D) Burner ON
- (E) Burner OFF
- (F) Set heating curve
- (G) Set max. boiler water temperature

2.1 General design notes

Delivery, handling and installation

Delivery

We deliver the equipment to site by a vehicle with a crane facility and will unload the equipment without special requirements.

Handling and installation

If Vitogas 100 is delivered as block assembly, a number of lifting eyes will be provided, where lifting gear may be attached. Handling presents no special difficulties if Vitogas 100 is delivered in individual sections.

The boilers may be placed onto a level concrete floor without special foundations.

However, to facilitate the cleaning of the boiler room, it is appropriate to position the boiler on a plinth.

Upon request, a Viessmann installation engineer may assist in the assembly (chargeable). For this purpose, the sections must be located in the installation area.

For recommended minimum distances from walls for installation and maintenance work, see Vitogas 100 datasheet.

2.1 Design in general

Location

General requirements

The boiler location should meet the Combustion Regulation standards set by the respective country.

In rooms where *air contamination through halogenated hydrocarbons* may occur, such as in hairdressing salons, printing shops, chemical cleaners and laboratories, boilers may only be installed if adequate measures can be taken to provide uncontaminated combustion air. If in doubt, please contact us.

Boilers should not be installed in areas subject to dusty or very humid conditions.

The boiler location should be kept free from frost and should be adequately ventilated.

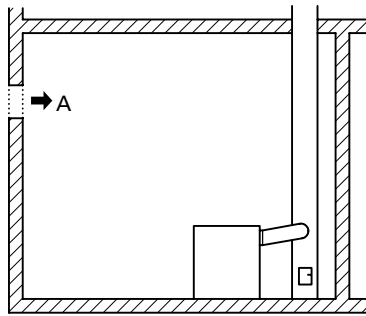
If these instructions are not observed, any consequential losses directly related to any of these causes are excluded from our warranty.

Requirements of the sample Combustion Regulation

Requirements laid down for boiler rooms are listed in the "Sample Combustion Regulation". The respective State Building Regulations and Combustion Regulations of the individual Federal States apply, which are essentially based on the following requirements of the sample Combustion Regulation.

Combustion air supply

For open flue combustion equipment with a total rated output higher than 50 kW, the fresh air supply is deemed to have been verified if the combustion equipment is located in areas which provide an aperture or pipe leading outdoors. The cross-section of the aperture should be at least 150 cm² and should be 2 cm² larger for each additional kW rated output above 50 kW. Pipes should be sized to provide equivalent flow rates. The required cross-section may be split to a maximum of 2 apertures or pipes.



$$A = 150 \text{ cm}^2 + 2 \frac{\text{cm}^2}{\text{kW}} \times (\sum \dot{Q}_N - 50 \text{ kW})$$

$\sum \dot{Q}_N$ = Total of all rated outputs in kW

Combustion air openings and pipes should not be closed or blocked if the safety equipment installed cannot adequately ensure that the combustion equipment can only be operated when the aperture is free. The required cross-section should not be reduced by a closure or grille.

An adequate combustion air supply can also be verified by other means.

Locations for combustion equipment

Combustion equipment for liquid or gaseous fuels with a rated output higher than 50 kW should only be installed in areas

- which are not used for other purposes, except the installation of heat pumps, CHP stations or permanently installed combustion engines as well as the storage of fuels
- which do not have openings leading to other rooms - except door openings,
- whose doors are tight and self-closing, and
- which can be ventilated.

The burner and control unit of Vitogas 100 should be able to be switched off at any time by an emergency stop switch installed outside the installation room. Next to the emergency stop switch, a sign should be positioned with the inscription "EMERGENCY STOP SWITCH – COMBUSTION".

As an alternative to these regulations for installation areas, combustion equipment may also be installed in other areas, if

- the utilisation of these rooms makes this necessary and the combustion equipment can be safely operated, or
- if these rooms are located in a stand-alone building, whose only function is the operation of the combustion equipment and as fuel storage area.

Further requirements regarding the installation of combustion equipment

Fuel lines **should** be equipped with a device upstream of the gas-fired combustion equipment installed in the boiler room, which

- is able to automatically shut-off the fuel supply in case of an external thermal load in excess of 100 °C being exerted, and
- should be designed so that not more than 30 l/h – measured as air flow rate – can flow through or out of the fuel line, at a temperature of up to 650 °C and over a period of at least 30 minutes.

Combustion equipment should be installed far enough away from combustible materials and in-built furniture or be shielded from such material/furniture, that at the rated output of the combustion equipment, no temperatures higher than 85 °C can occur. Otherwise, maintain a distance of at least 40 cm.

System design

Flow temperatures

To keep distribution losses to a minimum, we recommend that the

- heat distribution system and the
 - domestic hot water heating
- are designed for a max. of 70 °C (flow temperature).

For boilers supplied with a boiler control unit, limit the max. boiler water temperature to 87/95 °C. Changing the control thermostat can increase the flow temperature.

Safety temperature

Viessmann boilers correspond to EN 303 and DIN 4702 and all are type-tested.

They are suitable for installation in sealed heating systems acc. to DIN 4751.

Selection of the rated output

Select boilers acc. to the required heat demand.

The level of efficiency of low-temperature and condensing boilers is consistent across a wide range of boiler loads. Therefore, the rated output for low-temperature boilers, condensing boilers and multi-boiler systems may be higher than the calculated heat demand of the building in question.

Standard efficiency

The standard efficiency for Vitogas 100 is 93 % – at a heating system temperature of 75/60 °C.

The standard efficiency acc. to DIN 4702-8 is the decisive measure to identify the energy utilisation of a boiler. It includes all boiler losses (flue gas, radiation and standby losses) which are predominantly influenced by the boiler water temperature and the boiler load. The values calculated acc. to DIN 4702-8 correspond to the typical use of a heating system during the course of a year.

Operating mode

Vitogas 100 is operated with modulating boiler water temperature (lower boiler water temperature 40 °C). We generally recommend you install a mixer because of the lower boiler water temperature of 40 °C.

2.2 Water connection

Heating connections

Existing systems

Flush the heating system thoroughly to remove dirt and sludge deposits, before connecting the boiler to an existing heating system.

Otherwise these dirt and sludge deposits will settle in the boiler, and can lead to local overheating, noise and corrosion. Our warranty excludes boiler damage caused by such deposits. Where necessary, install dirt traps.

Primary connections

Connect all heat consumers or heating circuits to the boiler flow and return connectors. Do not connect to drains or other connections.

We recommend you install shut-off valves into the heating flow and return pipes, so that the entire water contents are not drained when work is required on the boiler or heating circuits.

Heating circuits

For underfloor heating, we recommend the use of impermeable pipes to prevent the infusion of oxygen through the pipe walls. Provide system segregation in underfloor heating systems for plastic pipes acc. to DIN 4726 which are not impermeable to oxygen.

Plastic radiator pipes

We also recommend the installation of a temperature limiter to limit the maximum temperature for plastic heating pipework in heating circuits with radiators.

We supply separate heat exchangers for this purpose.

Underfloor heating systems and heating circuits with a large water content should also be connected via mixers. Low-temperature and ultra-low-temperature boilers should be controlled by separate control units, e.g. Vitotronic 050.

Heating circuit pumps

Heating circuit pumps in heating systems with rated output > 50 kW should be equipped and designed in a way that matches the electrical power consumption to the operational throughput requirements in at least three stages, if no safety concerns relating to the **boiler** make alternative demands.

Application examples

- See chapter 3.1

These application examples are merely recommendations, and should therefore be checked to ensure that they are complete and fully functioning on site.

Connect three-phase consumers via additional contactors.

2.3 Safety equipment

2.3 Safety equipment acc. to DIN 4751-2

DIN 4751-2 applies to the design, installation and operation of sealed and thermostatically protected heat generator

systems for hot water with permissible flow temperatures of up to 100 °C in water-filled heating systems.

This standard contains safety requirements laid down for heat generators and heat generator systems.

Safety equipment acc. to DIN 4751-2	Required safety equipment
<p>① Delivered with Viessmann maximum pressure limiting assembly ② Delivered with Viessmann minimum pressure limiting assembly</p>	<p>ADG Sealed expansion vessel AV1 Shut-off valve AV2 Shut-off valve (protected against unintentional closing, e.g. cap valve) E Drain EST Flash trap MA Pressure gauge assembly SDB1 Safety pressure limiter max. SDB2 Safety pressure limiter min. SIV Safety valve SL Safety expansion pipe STB High limit safety cut-out TH Thermometer TR Control thermostat WB Water level limiter</p>
	<p>Further legends</p> <p>HK Heating circuit HKP Heating circuit pump HR Heating water return HV Heating water flow</p>

General notes

Low water indicator

Acc. to DIN 4751-2, a special low water indicator can be omitted for boilers up to 350 kW, as long as heating can be reliably stopped when the water level is too low. Viessmann Vitogas 100 boilers are equipped with a low water indicator (boil-dry protection). Tests have verified that the burner will be automatically switched off in case of water shortage, before the boiler or flue gas systems reach unacceptably high temperatures.

Maximum pressure limiter

Required for each boiler in systems with a

- rated boiler output > 350 kW or a
- safety pressure > 3 bar.

Minimum pressure limiter

Required in accordance with DIN 4751-2 in case of safety temperatures > 100 °C (install into the expansion pipe). In multi-boiler systems, one minimum pressure limiter per system is required.

Safety valve

Equip the boilers acc. to DIN 4751-2 with a type-tested safety valve

- for hot water heating systems up to 100 °C flow temperature and
- for hot water heating systems up to 120 °C flow temperature as well as according to their type approval. Identify this valve in accordance with TRD 721, i.e. with
- "H" up to 3.0 bar permissible operating pressure and max. 2700 kW rated output, and with
- "D/G/H" for all other operating conditions.

The pipework between the boiler and the safety valve should not be able to be shut off. Pumps, fittings or restrictions in this pipework should be avoided.

Flash trap

For boilers above 350 kW, install a flash trap with blow-off and drain line adjacent to the safety valve. The blow-off line should lead outdoors. Any expelled steam should not endanger anyone.

The blow-off line from the safety valve should be designed and constructed so as to prevent the possibility of increases in pressure.

Arrange the outlet of the blow-off line so that any water expelled from the safety valve can be safely observed and drained off.

Flash trap and blow-off line can only be omitted, if

- the high limit safety cut-out is set to 100 °C, and
- a second high limit safety cut-out and a second maximum pressure limiter are installed.

Safety equipment selection table

This table indicates the safety equipment required for each system acc. to DIN 4751-2.
(X = required, – = not required)

Rated boiler output	≤ 350 kW				> 350 kW	
Safety temperature (STB setting ^{*1} , STB part of the standard delivery of the boiler control unit) and operating pressure (safety pressure)	100 °C		110 or 120 °C		100 °C	110 or 120 °C
	≤ 3 bar	> 3 bar	≤ 3 bar	> 3 bar	unlimited	
Control thermostat Standard delivery of the boiler control unit	X	X	X	X	X	X
Boiler thermometer Standard delivery of the boiler control unit	X	X	X	X	X	X
Pressure gauge assembly Pressure gauge (as separate accessory) or as part of the maximum pressure limiting assembly or the safety equipment block	X	X	X	X	X	X
Safety valve A 3 bar safety valve is part of the safety equipment block	X	X on site	X	X	X on site	X
Water level limiter As low water indicator for vertical installation into the boiler	–	–	–	–	–	X
Max. pressure limiting assembly Incl. pressure gauge, protected shut-off valve, drain and additional connector for an additional high limit safety cut-out	–	X	–	X	X	X
Min. pressure limiting assembly With protected shut-off valve and drain	–	–	X	X	–	X
Flash trap	–	–	–	–	X ^{*2} on site	X
High limit safety cut-out^{*2} (additional)	–	–	–	–	X ^{*2}	–
Safety pressure limiter^{*2} (additional) (Maximum pressure limiter)	–	–	–	–	X ^{*2}	–

^{*1}In its delivered state, the high limit safety cut-out (STB) for Vitotronic is set to 120 °C and should be adjusted for lower safety temperatures.

^{*2}According to DIN 4751-2, the flash trap may be **omitted**, if the high limit safety cut-out of the boiler control unit has been set to 100 °C and an additional high limit safety cut-out and safety pressure limiter (maximum pressure limiter) are installed.

2.4 Flue gas connection

2.4 Flue gas connection

Flue gas connection

The following requirements regarding design and installation apply to flue gas systems for gas-fired combustion equipment:

Prior to work on the flue gas system, the heating contractor should confer with the responsible district chimney sweep (where applicable).

It is advisable to record the district chimney sweep's visits.

Standard forms are available from the regional building inspectorate (where appropriate).

Gas-fired combustion equipment should be connected to the chimney stack on the floor where they are installed (no transition through separating ceilings).

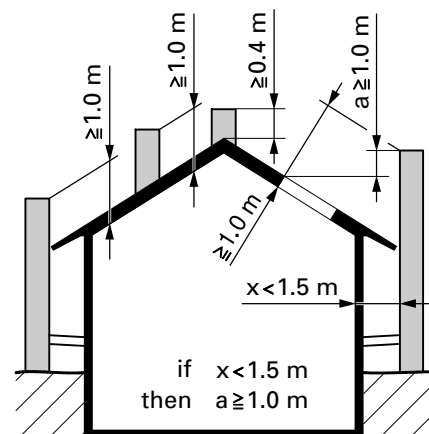
Requirements for flue gas systems are contained in the sample Combustion Regulation dated September 1997, which forms the basis of the Combustion Regulations of each Federal State.

Accordingly, the following are required:

- Flue gas systems should be sized for clearance diameter and height and, where necessary, also according to the heat throughput resistance and the internal surfaces, so that the flue gases will be expelled to the outside under all operating conditions and so that no dangerous pressures can be created in any rooms.
- Flue gases from combustion equipment fired by liquid or gaseous fuels must be able to be piped into chimney stacks or into flue pipes.
- Flue pipes mounted on the side of buildings should be at least 20 cm away from windows.

■ Outlets from chimneys or flue pipes should be

- at least 40 cm higher than the roof ridge or be at least 1 m from the roof surface,
- at least 1 m higher than roof mounted structures and openings to rooms, if their distance to chimneys and flue pipes is less than 1.5 m,
- at least 1 m higher than open structural parts made from combustible material, except roof coverings or be at least 1.5 m away from them.
- Further deviating requirements may apply if there is danger or unacceptable nuisance should be expected.



Multi-boiler systems

CE certified flue gas collectors are located on the flue side of boilers. Each boiler is equipped with its own draught hood. For multi-boiler systems, the flue gas collector is part of the standard delivery, see price list for details.

Flue gas system design

In multi-boiler systems with two or three Vitogas 100 boilers, the flue gas temperatures and minimum temperatures listed in the Technical Datasheet of the boiler under "Specification", i.e. 80 °C acc. to DIN 4702-3, cannot be maintained.

During operation with part loads, the flue gas temperature may fall below 80 °C.

The selected flue gas system design should take this fact into account (e.g. moisture-resistant flue gas system). We recommend the installation of motorised flue gas dampers.

Installation requirements

Implement the ventilation and extraction system for boiler rooms in accordance with the Combustion Regulation of the individual state as well as TRGI '86/96 or TRF 1996.

The connection pieces from the flue gas collector to the chimney stack should be installed with a gradient of at least 30 mm/m.

Because of the low flue gas temperatures we recommend that the flue gas collector and the connection piece are covered with a refractory thermal insulation to counteract the formation of condensate in the flue gas system.

Only install components, which are an approved part of the flue pipe in accordance with current Building Regulations.

2.5 Flue gas re-circulation

Sizing the flue gas system

Calculating the cross-sections of the flue gas system is the basis of and a pre-requisite for the proper function of any flue gas system.

You can determine the cross-section of the flue gas system depending on the rated output and the effective height of the flue gas systems using the following cross-section diagram.

DIN 4705 was taken into consideration in calculating the cross-section diagram. These calculations are based on the following parameters:

- Flue gas temperature downstream of the draught hood approx. 120 °C and ambient temperature + 15 °C. Higher flue gas temperatures generally only improve the draught a little.
- The effective flue gas system height equals the height difference between the boiler flue connection and the flue gas outlet.
- Length of the connection piece max. $\frac{1}{4}$ of the effective flue gas system height, but not more than 7 m.
The connection adapter and flue gas system should have the same cross-section.

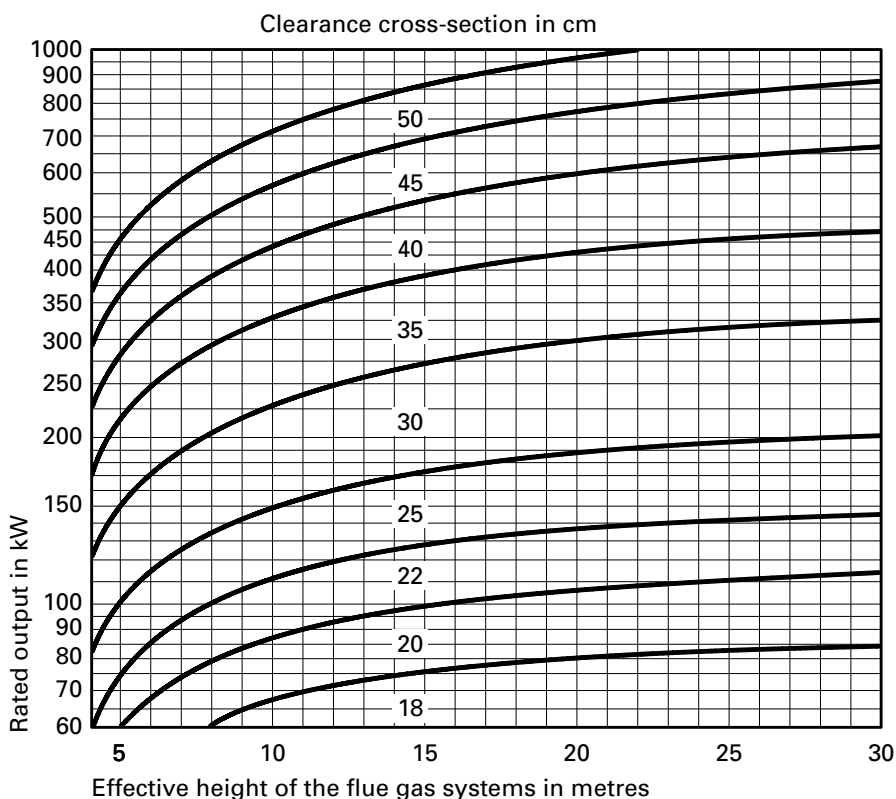
- Drag coefficient $\Sigma\zeta$ for reversing, inlet, shape and velocity alterations equals 2.2 (diagram acc. to Schiedel).
- The drag coefficient $\Sigma\zeta = 2.2$ covers, for example, the losses of a connection adaptor with an inlet less than 10 ° and two bends of 90 ° and an increase in velocity which may possibly be required.
- We recommend that flue gases enter the flue gas system at an angle of less than 45 °.

Chimney diagram

Check, when applying the diagram, whether the parameters for calculating the flue gas temperature, length of connection piece and of the drag coefficient have been maintained.

In case of more severe deviations, the technical departments of flue gas system manufacturers will calculate cross-sections, which are accurately matched to each individual project.

Diagram for circular cross-sections (Schiedel)



The diagram shown is also a valid representation for other manufacturers. The installing contractor should check how far this diagram may be applied to the flue gas systems of other manufacturers.

2.6 Gas connection

2.7 Electrical connection

2.6 Gas connection

Gas installations should only be carried out by an approved installer, who has been authorised by the relevant gas supplier.
Connect the mains gas acc. to TRGI '86/96 or TRF 1996.

Max. test pressure 150 mbar.
We recommend the installation of a gas filter acc. to DIN 3386 into the gas supply line.

Thermal safety shut-off valve

According to paragraph 4, sect. 5 of the FeuVo '96, thermal shut-off equipment, which isolate the gas supply if external temperatures exceed 100 °C should be installed into gas-fired combustion equipment. These valves should isolate the gas supply for at least 30 minutes up to a temperature of 650 °C. This should prevent the formation of explosive gas mixtures in case of fires.

Additional requirements when installing boilers with liquid gas operation in rooms under ground level.

Acc. to TRF 1996 Vol. 2 – valid as of the 1st September 1997 – an external safety solenoid valve is no longer required when installing Vitogas 100 under ground level. However, the high safety standard derived from the use of an external safety solenoid valve has proved to be valuable. We therefore recommend the continued installation of an external safety solenoid valve when installing Vitogas 100 in rooms below ground level. This valve is connected directly to the burner.

2.7 Electrical connection

Implement the electrical connection and the electrical installation in accordance with VDE regulations, local regulations and the technical specification for mains electrical connections prescribed by your electricity supplier.

2.8 Standard values for water quality

The service life of the heat generator and the complete heating system is influenced by the water conditions. In any event, the cost of a water treatment facility is less than the cost of repairing defects on your heating system.

It is necessary to maintain the following requirements to safeguard your warranty rights. The manufacturer's warranty excludes damage due to corrosion and scaling.

The following is a summary of essential requirements for water quality.

For comprehensive references, see the separate Technical Guide "Standard values for water quality".

Heating systems with rated operating temperatures up to 100 °C (VDI 2035)

Long-term experience has shown that scaling does not need to be completely prevented in order to safeguard against system defects. For this reason, the VDI guideline 2035 permits, depending on the respective total boiler rating of your system, a certain amount of

calcium hydrogen carbonate to enter the system along with the filling water (see also the corresponding explanatory remarks in the original text of the relevant guideline).

The total filling volume comprises the initial fill and the volume of replenishing water plus any refill (an exception would be, if the boiler is de-scaled).

Requirements to be satisfied by the heating water

Total boiler system output of the system [\dot{Q}]	Calcium hydrogen carbonate concentration [$\text{Ca}(\text{HCO}_3)_2$] of the fill and replenishing water	Max. volume of water for filling and replenishing [V_{max}]
$\dot{Q} \leq 100 \text{ kW}$	no requirement*1	no requirement*1
$100 \text{ kW} < \dot{Q} \leq 350 \text{ kW}$ $350 \text{ kW} < \dot{Q} \leq 1000 \text{ kW}$	$\text{Ca}(\text{HCO}_3)_2 \leq 2.0 \text{ mol/m}^3$ $\text{Ca}(\text{HCO}_3)_2 \leq 1.5 \text{ mol/m}^3$	$V_{\text{max}} [\text{m}^3] = \text{triple system volume}$ (or calculation of V_{max} as under line: $1000 \text{ kW} < \dot{Q}$)
$1000 \text{ kW} < \dot{Q}$	—	$V_{\text{max}} [\text{m}^3] = \frac{0.0313 \times \dot{Q} [\text{kW}]}{\text{Ca}(\text{HCO}_3)_2 [\text{mol/m}^3]}$ *2

*1 The requirements for systems with $\dot{Q} > 100 \text{ kW}$ apply to boiler changes in existing systems with an original value of $\dot{Q} > 100 \text{ kW}$ and system water volume $\geq 20 \text{ litres/kW}$.

*2 Apply this equation for heating systems $< 100 \text{ kW}$ and with a specific system volume $\geq 20 \text{ litres/kW}$.

Prevention of damage due to corrosion of the primary side

The corrosion resistance of ferrous materials on the primary side of heating systems and boilers depends on the absence of oxygen in the heating water. The oxygen introduced into the heating system with both the first fill and with replenishing water reacts with the system materials, without causing damage. The characteristic blackening of the water after some time in use indicates, that free oxygen is no longer present. The Technical Rules and in particular the VDI guideline 2035-2 therefore recommend, that heating systems are designed and operate so that a constant ingress of oxygen into the heating water is prevented.

Oxygen can normally only enter during operation via

- open expansion vessels with water flow
- system vacuum
- gas-permeable components

Correctly sized sealed systems operating at the correct pressure – e.g. systems with diaphragm expansion vessel – offer good protection against the ingress of oxygen from the air into the system. Every part of

the heating system, even the suction side of the pump, should, under all operating conditions, be higher than the ambient atmospheric pressure. As a minimum requirement, the inlet pressure of the diaphragm expansion vessel should be checked during the annual maintenance procedure. Gas-permeable components, e.g. plastic pipes in underfloor heating systems, which are not impermeable, should not be used. Provide system separation if such components are used. This should separate the water flowing through the plastic pipes from other heating circuits, e.g. from the heat generator, by the provision of a corrosion resistant heat exchanger.

Hot water heating systems which are sealed – from a corrosion point of view – and where the above points were taken into consideration, require no additional corrosion protection measures. However, take additional precautions where there is a danger of oxygen ingress, e.g. by adding oxygen-binder sodium sulphite (5 – 10 mg/litre into the excess). The pH value of the heating water should be between 8.2 - 9.5.

Different conditions apply to systems which include aluminium components.

If chemicals are used to protect the system against corrosion, we would recommend that your chemical supplier certifies the suitability of additives vis-à-vis the boiler materials and the materials of other heating system components. We recommend you refer to the respective specialist in questions of water quality/treatment.

VDI guideline 2035-2 contains further details.

3.1 Application example 1

Application example 1 - Single boiler system with Vitogas 100 boiler and one heating circuit with mixer for controlling the heating circuit and the DHW heating

System:

Single boiler system with
■ Vitogas 100 (72 to 144 kW)
■ Vitotronic 200 (type KW2)

or

Vitotronic 100 (type GC1) with
Vitocontrol control panel and integrated
weather-compensated Vitotronic 333
(type MW1S) control unit

or

Vitotronic 100 (type KC2) and external,
weather-compensated control unit (for
connections, see page 42)

Please note:

*For single boiler systems with large water
contents (> 15 litres/kW) we recommend a
return temperature raising facility.*

Possible applications:

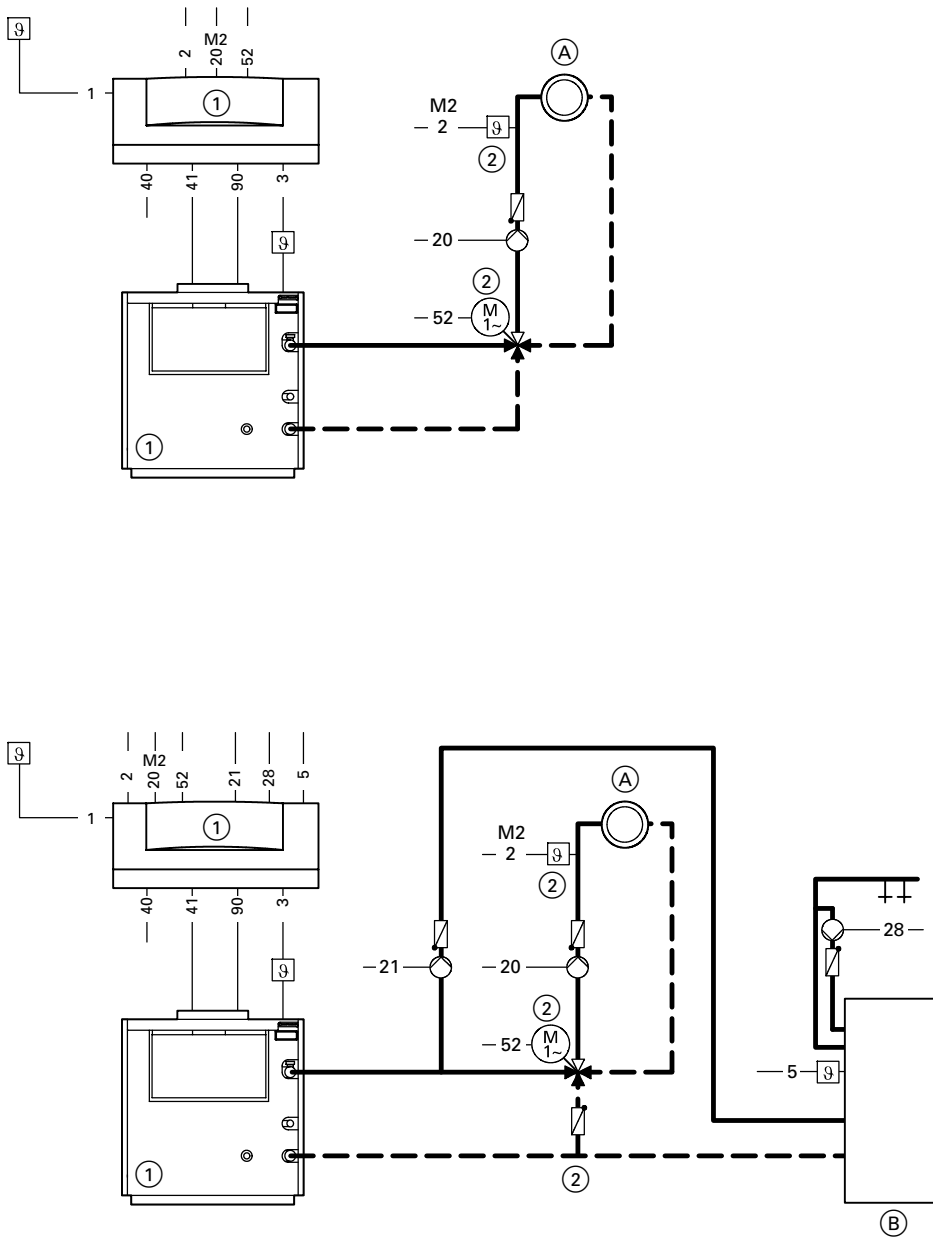
Heating systems with distributor installed
close to the boiler.

Equipment required

(For standard systems – equipment with additional system modules, see Vitotec 2 folder)

Item	Description	Number	Part no.
①	Boiler with Vitotronic	1	as per price list
②	Expansions for heating circuit with mixer in conjunction with Vitotronic 200 (type KW2)		
	– Extension kit for heating circuits with mixer	1	7450 650
	or		
	– Mixer motor for flanged mixer and plug-in connector	1	as per price list
	and		
	– Contact temperature sensor	1	7450 642
	or		
	– Immersion temperature sensor (incl. sensor well)	1	7450 641
	(see price list for further heating circuit control units)		

Installation diagrams



Plug-in connector

- 1 Outside temperature sensor*¹
- 2 M2 Flow temperature sensor mixer*¹
- 3 Boiler temperature sensor
- 5 DHW cylinder temperature sensor
- 20 M2 Heating circuit pump mixer*¹

- 21 Circulation pump for DHW cylinder heating
- 28 DHW circulation pump*¹
- 40 Electrical mains connection, 230V~/50 Hz
Install the mains isolator according to local regulations.

- 41 Burner (1st stage)
- 52 M2 Mixer motor*¹
- 90 Burner (2nd stage)

- (A) Heating circuit with mixer
- (B) Domestic hot water cylinder

3.1 Application example 2

Application example 2 - Single boiler system with Vitogas 100 boiler and one heating circuit with mixer and system separation

System:

Single boiler system with
 ■ Vitogas 100 (72 to 144 kW)
 ■ Vitotronic 200 (type KW2)

or

Vitotronic 100 (type GC1)
 with Vitocontrol control panel and
 integrated weather-compensated
 Vitotronic 333 (type MW1S) control unit

or

Vitotronic 100 (type KC2) and external,
 weather-compensated control unit (for
 connections, see page 42)

■ 3-way mixer.

Possible applications:

Heating systems with normal water
 contents.

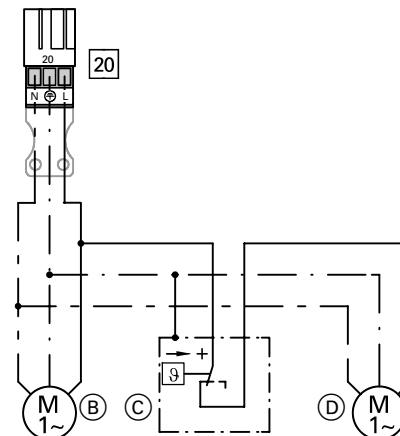
Heating circuit with system separation of
 underfloor heating.

Please note:

*For single boiler systems with large water
 contents (> 15 litres/kW) we recommend a
 return temperature raising facility.*

Wiring diagram

Pump connections for the underfloor
 circuit



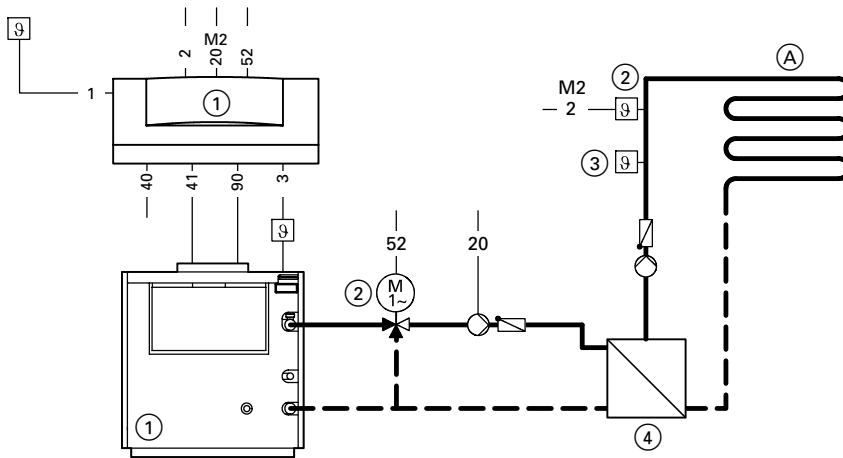
- 20 Heating circuit control
- B Primary pump – underfloor heating circuit
- C Maximum temperature limiter for underfloor heating circuit ③
- D Secondary pump – underfloor heating circuit (downstream of the system separation)

Equipment required

(For standard systems – equipment with additional system modules, see Vitotec 2 folder)

Item	Description	Number	Part no.
①	Boiler with Vitotronic	1	as per price list
②	Expansions for heating circuit with mixer in conjunction with Vitotronic 200 (type KW2)		
	– Extension kit for one heating circuit with mixer	1	7450 650
	or		
	– Mixer motor for flanged mixer and plug-in connector and	1	as per price list
	– Contact temperature sensor	1	7450 642
	or		
	– Immersion temperature sensor (incl. sensor well) (see price list for further heating circuit control units)	1	7450 641
③	Maximum temperature limiter for underfloor heating		
	– Contact limit thermostat	1	7415 026
	or		
	– Immersion limit thermostat	1	7415 025
④	Vitotrans 100	1	as per price list

Installation diagram



Plug-in connector

- 1 Outside temperature sensor*¹
 2 M2 Flow temperature sensor mixer*¹
 3 Boiler temperature sensor

- 20 M2 Heating circuit pump mixer*¹
 40 Electrical mains connection,
 230V~/50 Hz
 Install the mains isolator
 according to local regulations.

- 41 Burner (1st stage)
 52 M2 Mixer motor*¹
 90 Burner (2nd stage)

- A Underfloor heating circuit

3.1 Application example 3

Application example 3 - Single boiler system with Vitogas 100 boiler and one heating circuit with mixer, distributor pump and low-pressure distributor

System:

Single boiler system with

- Vitogas 100 (72 to 144 kW)
- Vitotronic 200 (type KW2)

or

Vitotronic 100 (type GC1) with Vitocontrol control panel and integrated weather-compensated Vitotronic 333 (type MW1S) control unit

or

Vitotronic 100 (type KC2) and external, weather-compensated control unit (for connections, see page 42)

- Distributor pump
- Low-pressure distributor.

Possible applications:

If the distributor is located in remote sub-stations (> 20 m). The heating system volume flow must be able to be reduced.

If it is not possible to reduce the heat transfer to the heating circuits, e.g. in older systems, we would recommend that the boiler is connected in accordance with the example on pages 28 and 29.

Function description:

If the actual temperature falls below the required minimum return temperature, the limit thermostat T1 reduces or closes the mixer.

Size the distributor pump to 110% of the total throughput capacity of the heating system.

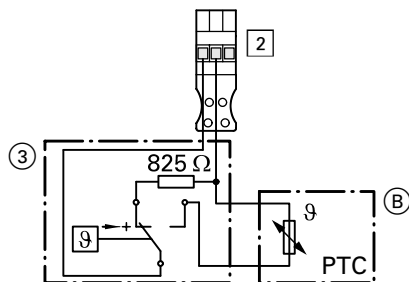
Advantages:

You will not need costly mixing valves to raise the return temperature.

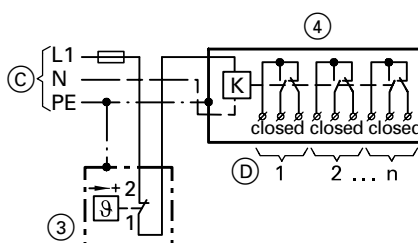
Wiring diagram

Connection of the limit thermostat T1

■ in conjunction with Vitotronic 200 (type KW2)

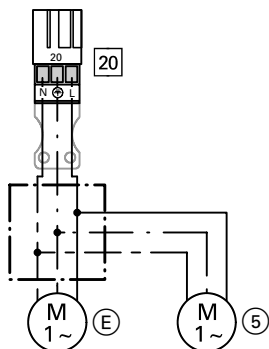


■ in conjunction with Vitotronic 100 (type KW2)



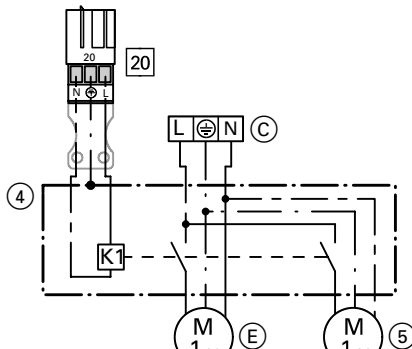
Connection of the heating circuit and distribution pump

■ For pumps with a power consumption of $\leq 4A$



(B) Flow temperature sensor (2)
(C) Mains electrical connection 230V~/50 Hz

■ For pumps with a power consumption of $\geq 4A$



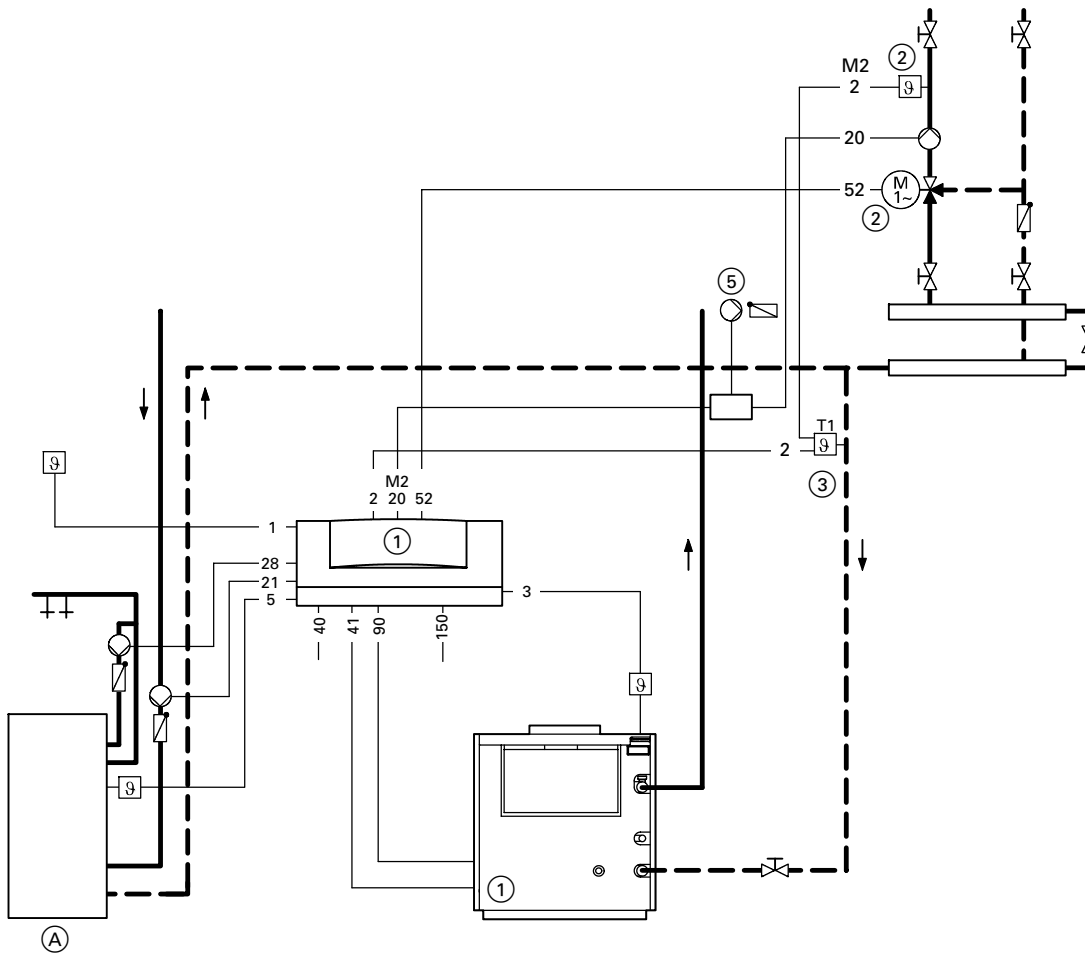
(D) Downstream heating circuit control unit contact closed: signal for "Close mixer"
(E) Heating circuit pump

Equipment required

(For standard systems – equipment with additional system modules, see Vitotec 2 folder)

Item	Description	Number	Part no.
①	Boiler with Vitotronic	1	as per price list
②	Expansions for heating circuit with mixer in conjunction with Vitotronic 200 (type KW2)		
	– Extension kit for heating circuits with mixer	1	7450 650
	or		
	– Mixer motor for flanged mixer and plug-in connector	1	as per price list
	and		
	– Contact temperature sensor	1	7450 642
	or		
	– Immersion temperature sensor (incl. sensor well)	1	7450 641
③	Limit thermostat T1	1	9581 658
④	Contact relay	1	7814 681
⑤	Distributor pump	1	on site

Installation diagram



Plug-in connector

- 1 Outside temperature sensor*¹
- 2 M2 Flow temperature sensor mixer*¹
- 3 Boiler temperature sensor
- 5 DHW cylinder temperature sensor
- 20 M2 Heating circuit pump mixer*¹
- A Domestic hot water cylinder

- 21 Circulation pump for DHW cylinder heating
- 28 DHW circulation pump*¹
- 40 Electrical mains connection, 230V~/50 Hz
Install the mains isolator according to local regulations.

- 41 Burner (1st stage)
- 52 M2 Mixer motor*¹
- 90 Burner (2nd stage)
- 150 External hooking up, see page 42*²

3.1 Application example 4

Application example 4 - Single boiler system with Vitogas 100 boiler and two heating circuits with mixer, distributor pump and low-pressure distributor

System:

- Single boiler system with
- Vitogas 100 (72 to 144 kW)
 - Vitotronic 300 (type GW2)
- or
- Vitotronic 100 (type GC1) with Vitotronic control panel and integrated weather-compensated Vitotronic 333 (type MW1S) control unit
- or
- Vitotronic 100 (type KC2) and external, weather-compensated control unit (for connections, see page 42)
 - Distributor pump
 - Low-pressure distributor.

Possible applications:

If the distributor is located in remote sub-stations (> 20 m). The heating system volume flow must be able to be reduced.

Function description:

If the actual temperature falls below the required minimum return temperature, the limit thermostat T1 reduces or closes the mixer.
Size the distributor pump to 110% of the total throughput capacity of the heating system.

The boiler receives optimum protection when using a Vitotronic 300. No additional protective measures are required on site.

If it is not possible to reduce the heat transfer to the heating circuits, e.g. in older systems, we would recommend that the boiler is connected in accordance with the example on pages 28 and 29.

Advantages:

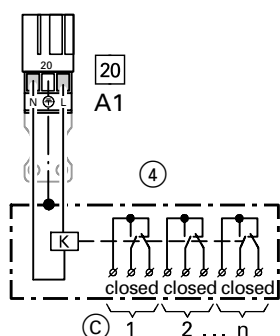
You will not need costly mixing valves to raise the return temperature.

Wiring diagram

Wiring for reducing the volume flow via the limit thermostat T1 in heating systems with heating circuit control units, which are not connected to the boiler control unit via the LON BUS.

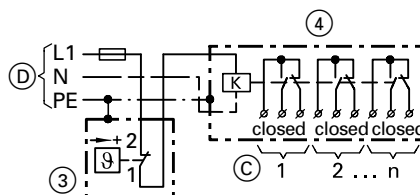
Connection of the limit thermostat T1

- in conjunction with Vitotronic 100 (type GC1)
Necessary coding:
change "4C" to "2" – use the plug-in connector 20 A1 to close the downstream mixer.



- 20 A1 Closing the mixer
- C Downstream heating circuit control unit contact closed: signal for "Close mixer"

- in conjunction with Vitotronic 100 (type KC2)



- C Downstream heating circuit control unit contact closed: signal for "Close mixer"
- D Mains electrical connection, 230V~/50 Hz

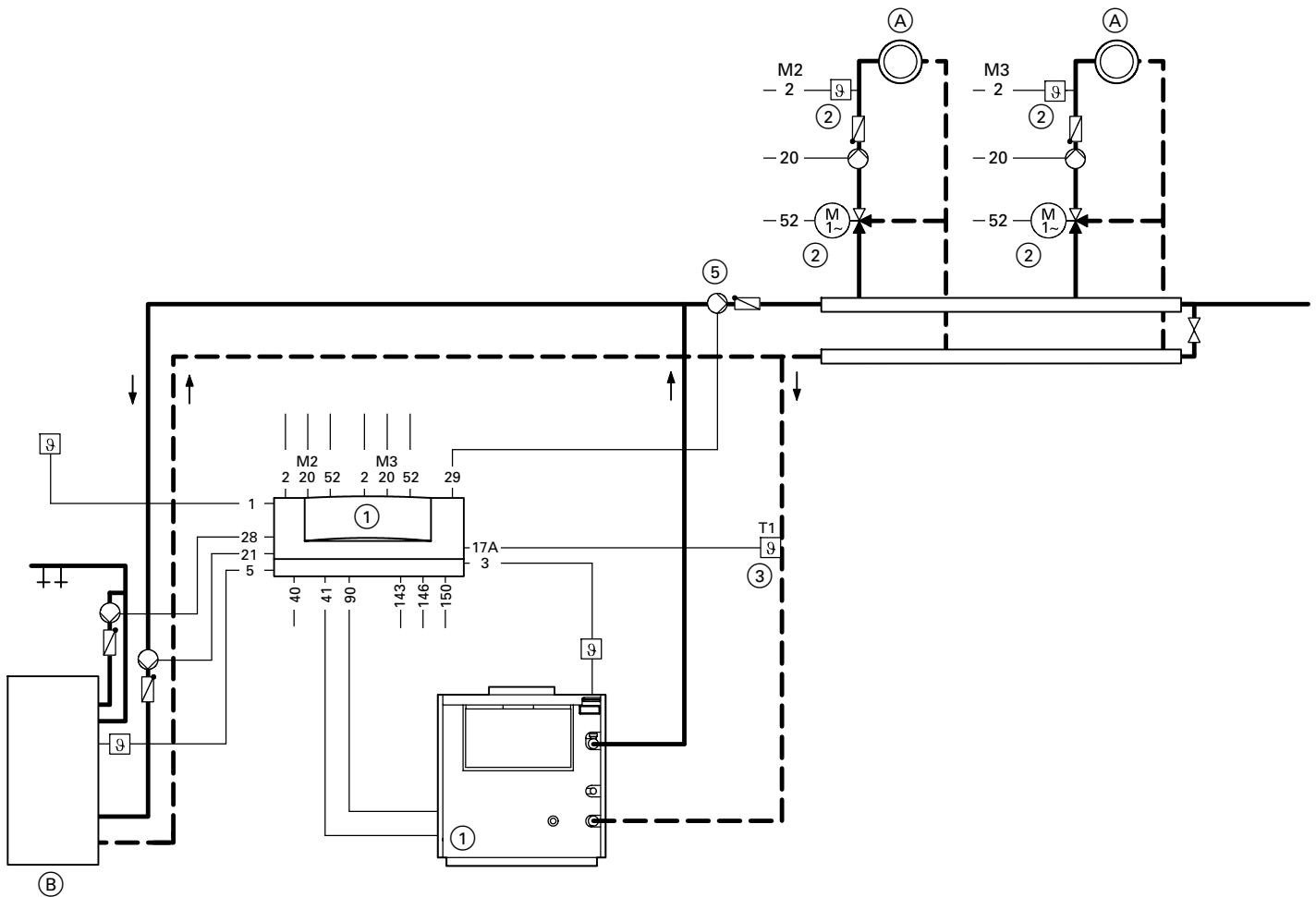
The distributor pump must be connected to the external control unit, if an external weather-compensated control unit is used.

Equipment required

(For standard systems – equipment with additional system modules, see Vitotec 2 folder)

Item	Description	Number	Part no.
①	Boiler with Vitotronic	1	as per price list
②	Expansions for heating circuits with mixer with Vitotronic 300 (type GW2)		
	– Extension kit for one heating circuit with mixer		7450 650
	or		
	– Mixer motor for flanged mixer and plug-in connector		as per price list
	and		
	– Contact temperature sensor		7450 642
	or		
	– Immersion temperature sensor (incl. sensor well)		7450 641
③	Temperature sensor T1 (in conjunction with Vitotronic 300)		
	– Contact temperature sensor	1	7450 642
	or		
	– Immersion temperature sensor (incl. sensor well)	1	7450 641
	or		
	Temperature sensor T1 (in conjunction with Vitotronic 100)	1	Z001 886
④	Contactor relay	1	7814 681
⑤	Distributor pump	1	on site

Installation diagram



Plug-in connector

- 1 Outside temperature sensor*¹
- 2 M2 Flow temperature sensor mixer*¹
- 2 M3 Flow temperature sensor mixer*¹
- 3 Boiler temperature sensor
- 5 DHW cylinder temperature sensor (accessory for Vitotronic 100)
- 17 A Temperature sensor T1*¹

- 20 M2 Heating circuit pump mixer*¹
- 20 M3 Heating circuit pump mixer*¹
- 21 Circulation pump for DHW cylinder heating
- 28 DHW circulation pump*¹
- 29 Distributor pump*¹
- 40 Electrical mains connection, 230V~/50 Hz
Install the mains isolator according to local regulations.

- 41 Burner (1st stage)
- 52 M2 Mixer motor*¹
- 52 M3 Mixer motor*¹
- 90 Burner (2nd stage)
- 143 External hooking up*¹
- 146 External hooking up*¹
see from page 44
- 150 External hooking up,
see page 42*²

- A Heating circuit with mixer
- B Domestic hot water cylinder

3.1 Application example 5

Application example 5 - Single boiler system with Vitogas 100 boiler and one heating circuit with mixer plus shunt pump for raising the return temperature

System:

- Single boiler system with
- Vitogas 100 (72 to 144 kW)
 - Vitotronic 200 (type KW2)
- or
- Vitotronic 100 (type GC1) with Vitocontrol control panel and integrated weather-compensated Vitotronic 333 (type MW1S) control unit
- or
- Vitotronic 100 (type KC2) and external, weather-compensated control unit (for connections, see page 42)
- Shunt pump

Possible applications:

Heating systems with distributor installed close to the boiler. The boiler water volume flow must be able to be reduced.

Function description:

The limit thermostat T2 activates the shunt pump, if the actual temperature falls below the required minimum return temperature. If the minimum return temperature is not reached even if the return temperature is reached, the volume flow must be reduced by at least 50 % via the limit thermostat T1.

Size the shunt pump to approx. 30 % of the total throughput capacity of the boiler.

If it is not possible to reduce the boiler water volume flow, e.g. in older systems, we would recommend the example on pages 28 and 29.

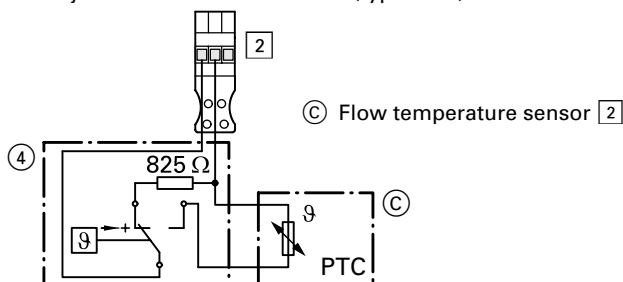
Advantages:

You will not need any boiler circuit pump or costly mixing valve to raise the return temperature.

Wiring diagram

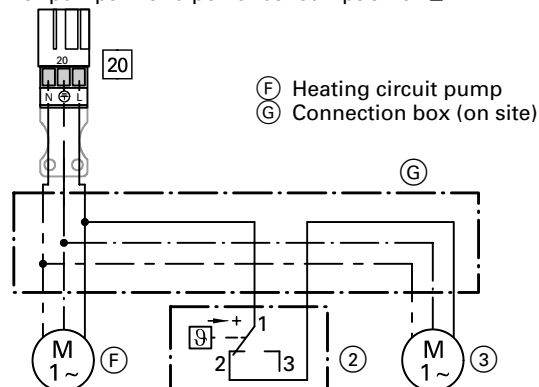
Connection of the limit thermostat T1

- in conjunction with Vitotronic 200 (type KW2)

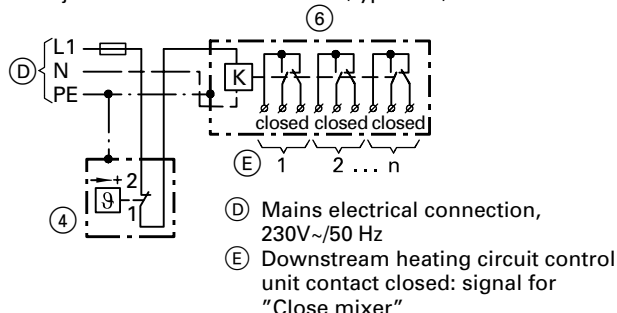


Connection of the heating circuit and shunt pumps

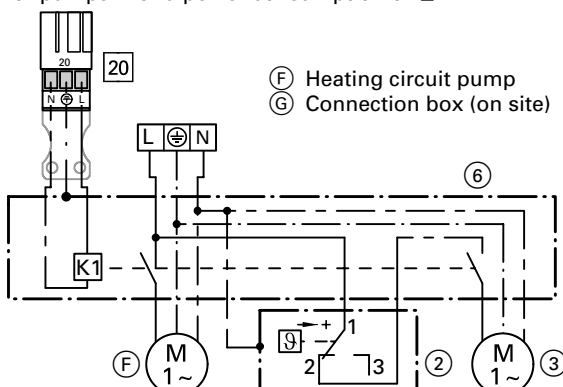
- For pumps with a power consumption of $\leq 4A$



- in conjunction with Vitotronic 100 (type KC2)



- For pumps with a power consumption of $\geq 4A$

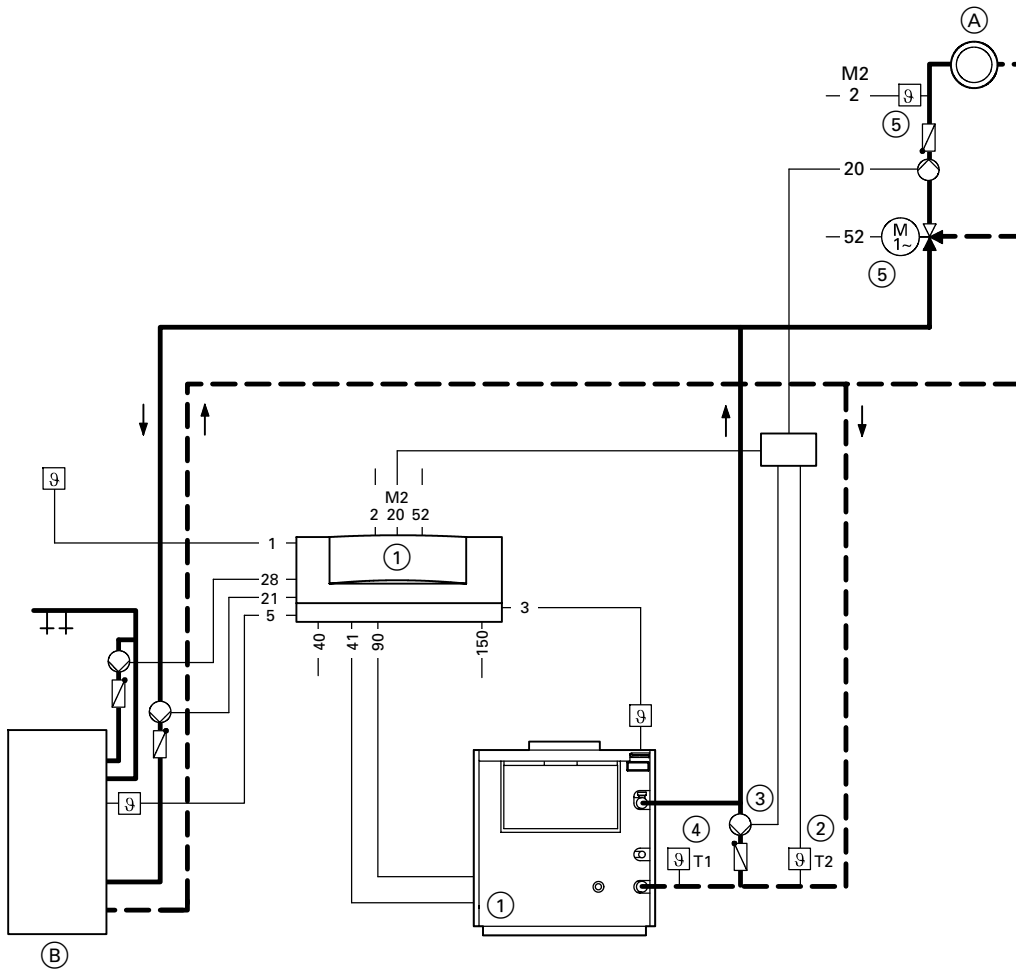


Equipment required

(For standard systems – equipment with additional system modules, see Vitotec 2 folder)

Item	Description	Number	Part no.
①	Boiler with Vitotronic	1	as per price list
②	Limit thermostat T2	1	Z001 886
③	Shunt pump	1	on site
④	Limit thermostat T1	1	Z001 886
⑤	Expansions for heating circuit with mixer in conjunction with Vitotronic 200 (type KW2)	1	7450 650
	– Extension kit for one heating circuit with mixer	1	as per price list
	or		
	– Mixer motor for flanged mixer and plug-in connector	1	as per price list
	and		
	– Contact temperature sensor	1	7450 642
	or		
	– Immersion temperature sensor (incl. sensor well)	1	7450 641
	(see price list for further heating circuit control units)		
⑥	Contactor relay	1	7814 681

Installation diagram



Plug-in connector

- 1 Outside temperature sensor*¹
- 2 M2 Flow temperature sensor mixer*¹
- 3 Boiler temperature sensor
- 5 DHW cylinder temperature sensor
- 20 M2 Heating circuit pump mixer*¹

- 21 Circulation pump for DHW cylinder heating
- 28 DHW circulation pump*¹
- 40 Electrical mains connection, 230V~/50 Hz
Install the mains isolator according to local regulations.

- 41 Burner (1st stage)
- 52 M2 Mixer motor*¹
- 90 Burner (2nd stage)
- 150 External hooking up, see page 42*²

- A Heating circuit with mixer
- B Domestic hot water cylinder

Application example 6 - Single boiler system with Vitogas 100 boiler and two heating circuits with mixer plus shunt pump for raising the return temperature

System:

Single boiler system with

- Vitogas 100 (72 to 144 kW)
- Vitotronic 300 (type GW2)

or

Vitotronic 100 (type GC1) with Vitocontrol control panel and integrated weather-compensated Vitotronic 333 (type MW1S) control unit

or

Vitotronic 100 (type KC2) and external, weather-compensated control unit (for connections, see page 42)

- Shunt pump

Possible applications:
Heating systems with distributor installed close to the boiler. The boiler water volume flow must be able to be reduced.

Function description:

The temperature sensor T2 or the limit thermostat T2 activates the shunt pump, if the actual temperature falls below the required minimum return temperature. If the minimum return temperature is not reached, even if the return temperature is raised, the volume flow must be reduced by at least 50 % via the temperature sensor T1 or the limit thermostat T1. Size the shunt pump to approx. 30 % of the total throughput capacity of the boiler. If it is not possible to reduce the boiler water volume flow, e.g. in older systems, we would recommend the example on pages 28 and 29.

Advantages:

You will not need any costly boiler circuit pump or mixing valve to raise the return temperature.
The boiler receives optimum protection when using a Vitotronic 300 (type GW2). No additional on-site protective measures are required.

Wiring diagram

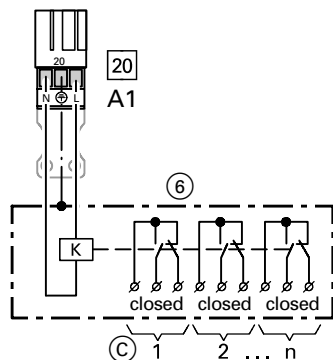
Connection of the temperature sensor or limit thermostat T1

- in conjunction with Vitotronic 300 (type GW2)

Wiring for reducing the volume flow via the limit thermostat T1 in heating systems with heating circuit control units, which are not connected to the boiler control unit via the LON BUS.

Necessary coding:

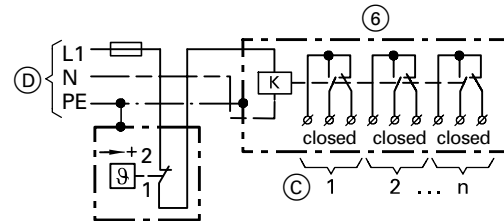
change "4C" to "2" – use the plug-in connector **20** A1 to close the downstream mixer.



20 A1 Closing the mixer

C Downstream heating circuit control unit contact closed: signal for "Close mixer"

- in conjunction with Vitotronic 100 (type KC2)

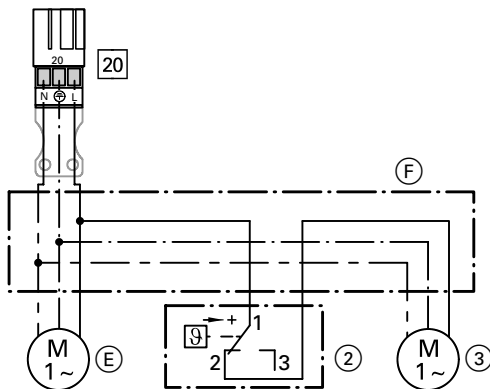


C Downstream heating circuit control unit contact closed: signal for "Close mixer"

D Mains electrical connection, 230V~/50 Hz

Connection of the heating circuit and the shunt pumps in conjunction with Vitotronic 100 (type KC2)

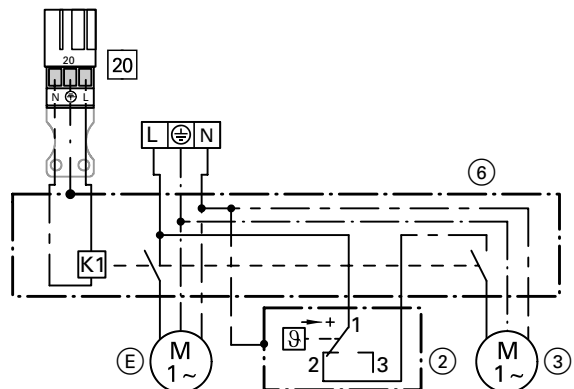
- For pumps with a power consumption of $\leq 4A$



E Heating circuit pump

F Connection box (on site)

- For pumps with a power consumption of $\geq 4A$



E Heating circuit pump

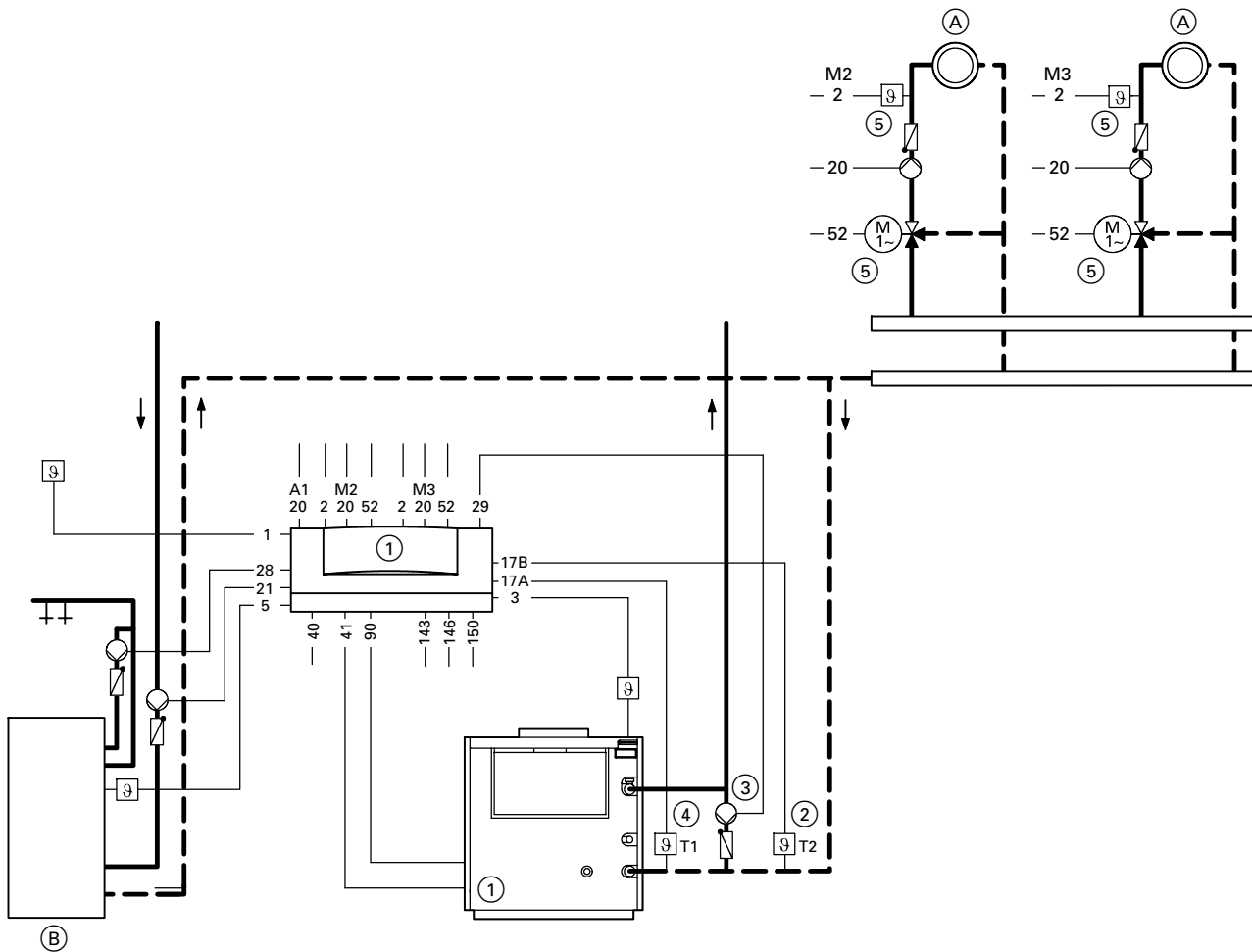
3.1 Application example 6

Equipment required

(For standard systems – equipment with additional system modules, see Vitotec 2 folder)

Item	Description	Number	Part no.
①	Boiler with Vitotronic	1	as per price list
②	Temperature sensor T2 (in conjunction with Vitotronic 300 (type GW2) – Contact temperature sensor	1	7450 642
	or – Immersion temperature sensor (incl. sensor well)	1	7450 641
	or Temperature sensor T2 (in conjunction with Vitotronic 100, type KC2)	1	Z001 886
③	Shunt pump	1	on site
④	Temperature sensor T1 (in conjunction with Vitotronic 300, type GW2) – Contact temperature sensor	1	7450 642
	or – Immersion temperature sensor (incl. sensor well)	1	7450 641
	or Limit thermostat T1 (in conjunction with Vitotronic 100, type KC2)	1	Z001 886
⑤	Expansions for heating circuits with mixer in conjunction with Vitotronic 300 (type GW2) – Extension kit for one heating circuit with mixer	1 or 2	7450 650
	or – Mixer motor for flanged mixer and plug-in connector	1 or 2	as per price list
	and – Contact temperature sensor	1 or 2	7450 642
	or – Immersion temperature sensor (incl. sensor well)	1 or 2	7450 641
	(see price list for further heating circuit control units)		
⑥	Contactor relay	1	7814 681

Installation diagram



Plug-in connector

- [1] Outside temperature sensor*¹
- [2] M2 Flow temperature sensor mixer*¹
- [2] M3 Flow temperature sensor mixer*¹
- [3] Boiler temperature sensor
- [5] DHW cylinder temperature sensor
- [17] A Temperature sensor T1*¹
- [17] B Temperature sensor T2*¹
- [20] M2 Heating circuit pump mixer*¹

- [20] M3 Heating circuit pump mixer*¹
- [20] A1 Closing the mixer with external heating circuit control units*¹
- [21] Circulation pump for DHW cylinder heating
- [28] DHW circulation pump*¹
- [29] Shunt pump*¹
- [40] Electrical mains connection, 230V~/50 Hz
Install the mains isolator according to local regulations.

- [41] Burner (1st stage)
- [52] M2 Mixer motor*¹
- [52] M3 Mixer motor*¹
- [90] Burner (2nd stage)
- [143] External hooking up*¹
- [146] External hooking up*¹ see from page 44
- [150] External hooking up, see page 42*²

- (A) Heating circuit with mixer
- (B) Domestic hot water cylinder

3.1 Application example 7

Application example 7 - Single boiler system with Vitogas 100 boiler and two heating circuits with mixer, shunt pump and 3-way mixer for raising the return temperature

System:

Multi-boiler systems with
 ■ Vitogas 100 (72 to 144 kW)
 ■ Vitotronic 300 (type GW2)
 or
 Vitotronic 100 (type GC1)
 with Vitocontrol control panel and
 integrated weather-compensated
 Vitotronic 333 (type MW1S) control unit
 or
 Vitotronic (type KC2) and external,
 weather-compensated control unit (for
 connections, see page 42)
 ■ Shunt pump
 ■ 3-way mixer

Possible applications:
 Heating systems, where downstream
 heating circuits cannot be controlled, e.g.
 older systems or nurseries.

System-specific coding

change "0C" to "1" – system with
 constant return temperature control.

Function description:

The limit thermostat T2 activates the shunt
 pump, if the actual temperature falls
 below the required minimum return
 temperature. If this does not achieve the
 required minimum return temperature, the
 temperature sensor T1 closes the 3-way
 mixer in proportion and therefore
 safeguards the minimum return
 temperature.

Advantages:

Proportional return temperature raising
 to protect the boiler. A boiler circuit pump
 is not required.

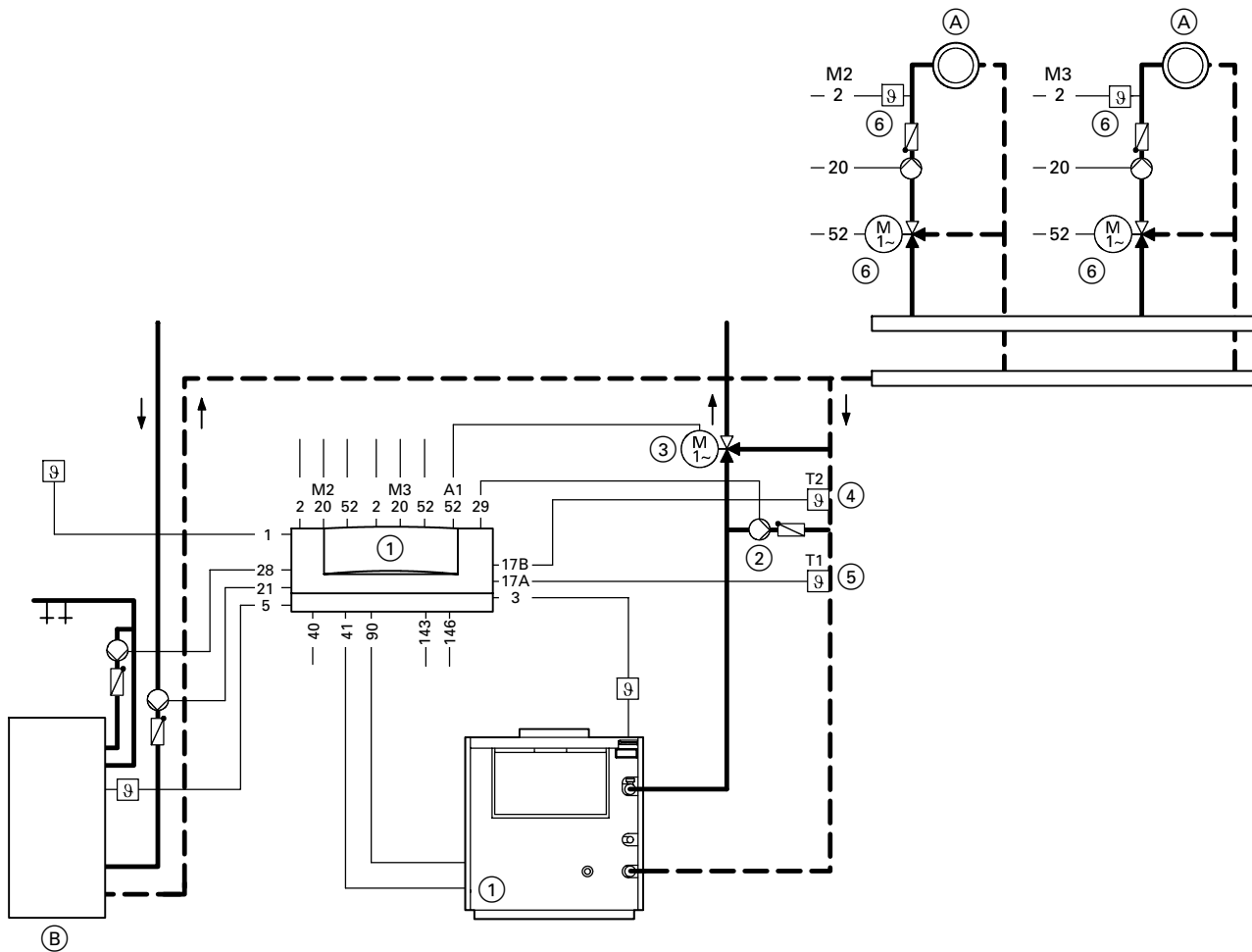
Boilers are protected against return
 temperature, which are too low,
 independent of the downstream heating
 circuits.

Equipment required

(For standard systems – equipment with additional system modules, see Vitotec 2 folder)

Item	Description	Number	Part no.
①	Boiler with Vitotronic	1	as per price list
②	Shunt pump	1	on site
③	3-way mixer	1	as per price list
④	Temperature sensor T2 (in conjunction with Vitotronic 300, type GW2) – Contact temperature sensor	1	7450 642
	or – Immersion temperature sensor (incl. sensor well)	1	7450 641
⑤	Temperature sensor T1 (in conjunction with Vitotronic 300, type GW2) – Contact temperature sensor	1	7450 642
	or – Immersion temperature sensor (incl. sensor well)	1	7450 641
⑥	Expansions for heating circuits with mixer in conjunction with Vitotronic 300 (type GW2) – Extension kit for one heating circuit with mixer	1 or 2	7450 650
	or – Mixer motor for flanged mixer and plug-in connector	1 or 2	as per price list
	and – Contact temperature sensor	1 or 2	7450 642
	or – Immersion temperature sensor (incl. sensor well) (see price list for further heating circuit control units)	1 or 2	7450 641

Installation diagram



Plug-in connector

1	Outside temperature sensor* ¹	20	M2	Heating circuit pump mixer* ¹	41	Burner (1st stage)
2	M2 Flow temperature sensor mixer* ¹	20	M3	Heating circuit pump mixer* ¹	52	A1 Mixer motor return temperature raising facility* ¹
2	M3 Flow temperature sensor mixer* ¹	21		Circulation pump for DHW cylinder heating	52	M2 Mixer motor* ¹
3	Boiler temperature sensor	28		DHW circulation pump* ¹	52	M3 Mixer motor* ¹
5	DHW cylinder temperature sensor	29		Shunt pump* ¹	90	Burner (2nd stage)
		40		Electrical mains connection, 230V~/50 Hz	143	External hooking up* ¹
17	A Temperature sensor T1* ¹			Install the mains isolator according to local regulations.	146	External hooking up* ¹
17	B Temperature sensor T2* ¹					see from page 44

- (A) Heating circuit with mixer
(B) Domestic hot water cylinder

3.1 Application example 8

Application example 8 - Multi-boiler system with Vitogas 100 boilers and with shunt pumps for raising the return temperature of each boiler

System:

Multi-boiler systems with

- Vitogas 100 (72 to 144 kW)
- Vitotronic 100 (type GC1) for every boiler in the multi-boiler system

and

Vitotronic 333 (type MW1) one for the whole multi-boiler system

or

Vitotronic 100 (type GC1) for every boiler in the multi-boiler system with Vitocontrol control panel and integrated weather-compensated Vitotronic 333 (type MW1S) control unit

or

Vitotronic 100 (type KC2) and external, weather-compensated cascade control unit with DHW cylinder temperature control (for connections, see page 43)

- Vitotronic 050
- Shunt pumps.

Possible applications:
Heating systems with distributor installed close to the boiler. The boiler water volume flow will be reduced via the motorised butterfly valves.

System-specific coding

For every Vitotronic 100 (type GC1) in the standard delivery condition:
T1 changes the position of the motorised butterfly valve:
T1 changes boiler circuit control unit:
change "0C" to "3" – butterfly valve activates acc. to temperature.
change "0D" to "1" – T1 controls the heating circuit control mixer.

Function description:

The temperature sensor T2 or the limit thermostat T2 activates the shunt pump, if the actual temperature falls below the required minimum return temperature. If the minimum return temperature is not reached, even if a return temperature raising facility is used, the volume flow must be reduced by at least 50 % via the temperature sensor T1, the limit thermostat T1 or the heating circuit control units.

Size the shunt pump to approx. 30% of the total throughput capacity of the boiler. The distributor pump(s) and the motorised butterfly valve(s) must be connected to the external control unit, if an external cascade control unit is used.

The boiler receives optimum protection when using Vitotronic 333 or if the heating circuits are controlled via a connected Vitotronic 050. No additional on-site protective measures are required.

Advantages:

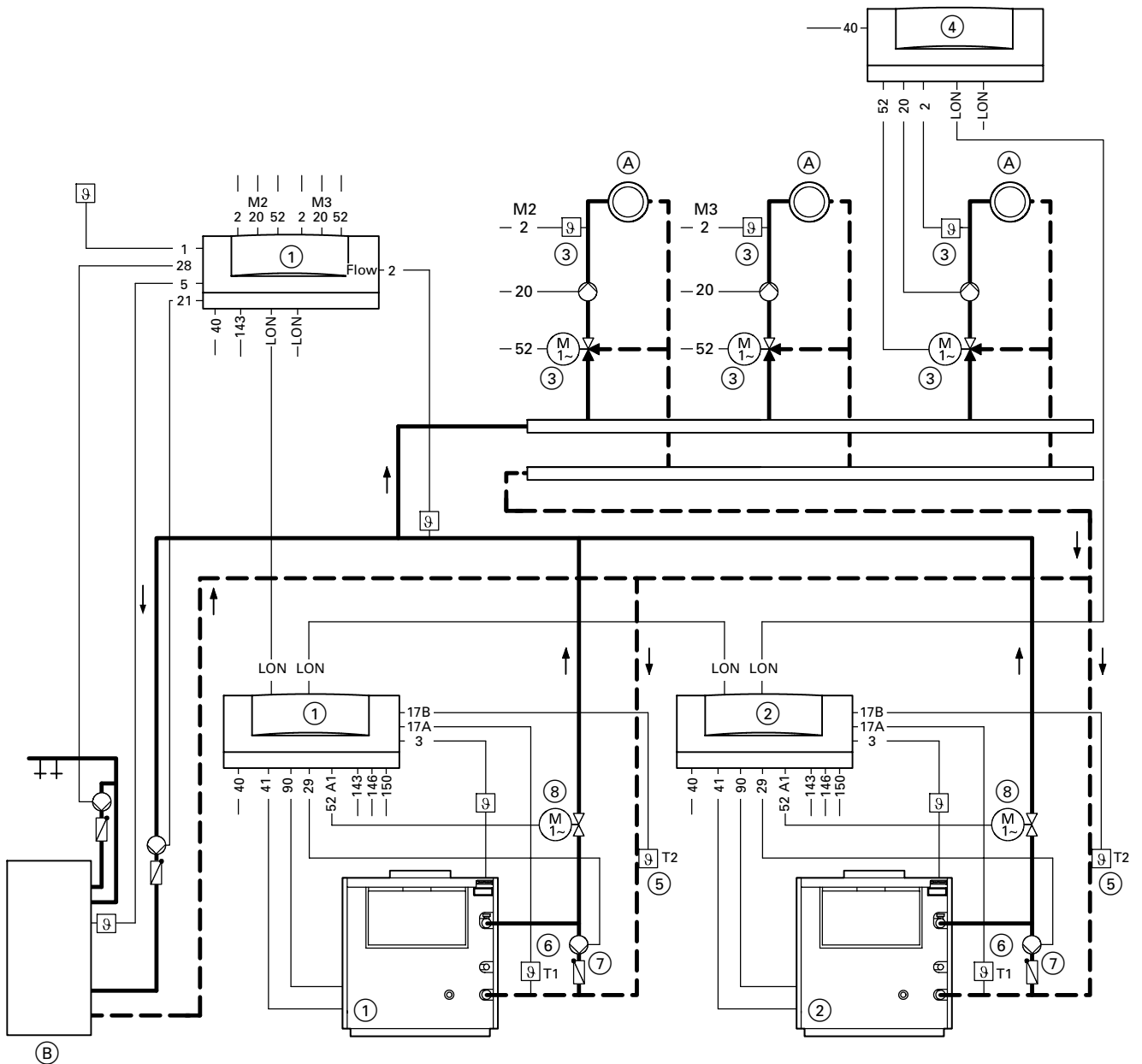
You will not need a boiler circuit pump or costly mixing valve to raise the return temperature.

Equipment required

(For standard systems – equipment with additional system modules, see Vitotec 2 folder)

Item	Description	Number	Part no.
①	Boiler with Vitotronic 100 and Vitotronic 333	1	as per price list
②	Boiler with Vitotronic 100	1 to 3	as per price list
③	Expansions for heating circuits with mixer with Vitotronic 333 and Vitotronic 050		
	– Extension kit for one heating circuit with mixer	corresp. to	7450 650
	or	heating circuits	
	– Mixer motor for flanged mixer and plug-in connector	corresp. to	as per price list
	and	heating circuits	7450 642
	– Contact temperature sensor	corresp. to	7450 641
	or	heating circuits	
	– Immersion temperature sensor (incl. sensor well)	corresp. to	7450 641
④	Vitotronic 050 (communication module LON required)	corresp. to	as per price list
		heating circuits	
⑤	Temperature sensor T2 (in conjunction with Vitotronic 100, type GC1)		
	– Contact temperature sensor	1 to 3	7450 642
	or		
	– Immersion temperature sensor (incl. sensor well)	1 to 3	7450 641
	or		
	Temperature sensor T2 (in conjunction with Vitotronic 100, type KC2)	1 to 3	Z001 886
⑥	Temperature sensor T1 (in conjunction with Vitotronic 100, type GC1)		
	– Contact temperature sensor	1 to 3	7450 642
	or		
	– Immersion temperature sensor (incl. sensor well)	1 to 3	7450 641
	or		
	Limit thermostat T1 (in conjunction with Vitotronic 100, type KC2)	1 to 3	Z001 886
⑦	Shunt pump	1 to 3	on site
⑧	Motorised butterfly valve	1 to 3	on site

Installation diagram



Plug-in connector

1	Outside temperature sensor* ¹	20 M2	Heating circuit pump mixer* ¹	52 A1	Motorised butterfly valve* ²
2	Flow Flow temperature sensor, common heating system flow* ¹	20 M3	Heating circuit pump mixer* ¹	52 M2	Mixer motor* ¹
2 M2	Flow temperature sensor mixer* ¹	20	Heating circuit pump	52 M3	Mixer motor* ¹
2 M3	Flow temperature sensor mixer* ¹	21	Vitotronic 050	52	Mixer motor Vitotronic 050
2	Flow temperature sensor	28	Circulation pump for DHW cylinder heating* ¹	90	Burner (2nd stage)
3	Vitotronic 050	29	DHW circulation pump* ¹	143	External hooking up* ¹
5	Boiler temperature sensor	40	Shunt pump* ²	146	External hooking up* ¹
5	DHW cylinder temperature sensor* ¹	41	Electrical mains connection, 230V~/50 Hz	150	External hooking up, * ³
17 A	Temperature sensor T1* ²		install the mains isolator according to local regulations.		see page 43
17 B	Temperature sensor T2* ²		Burner (1st stage)	LON	Connection LON-BUS (free connection with terminal resistor)
(A)	Heating circuit with mixer				
(B)	Domestic hot water cylinder				

*¹Only for Vitotronic 333.*²Only for Vitotronic 100 (type GC1).*³Only for Vitotronic 100 (type KC2).

3.1 Application example 9

Application example 9 - Multi-boiler system with Vitogas 100 boilers with distribution pump and low-pressure distributor

System:

- Multi-boiler systems with
- Vitogas 100 (72 to 144 kW)
 - Vitotronic 100 (type GC1) for every boiler in the multi-boiler system **and** Vitotronic 333 (type MW1) one for the whole multi-boiler system
- or
- Vitotronic 100 (type GC1) for every boiler in the multi-boiler system with Vitotronic control panel and integrated weather-compensated Vitotronic 333 (type MW1S) control unit
- or
- Vitotronic 100 (type KC2) and external, weather-compensated cascade control unit with DHW cylinder temperature control (for connections, see page 43)
 - Vitotronic 050
 - Distributor pump
 - Low-pressure distributor.

Possible applications:

If the distributor is located in remote sub-stations (> 20 m). The heating system volume flow must be able to be reduced.

System-specific coding

On Vitotronic 333
change "4D" to "0" – use the plug-in connector [29] for the distributor pump.
On every Vitotronic 100 (type GC1),
change "0D" to "1" – T1 affects the heating circuit control unit.

Equipment required

(For standard systems – equipment with additional system modules, see Vitotec 2 folder)

Function description:

If the actual temperature falls below the required minimum return temperature, the temperature sensor T1 or the limit thermostat T1 reduces or closes the mixer. Size the distributor pump to 110% of the total throughput capacity of the heating system.

The boiler receives optimum protection when using Vitotronic 333 and if the heating circuits are controlled via a connected Vitotronic 050. No additional on-site protective measures are required.

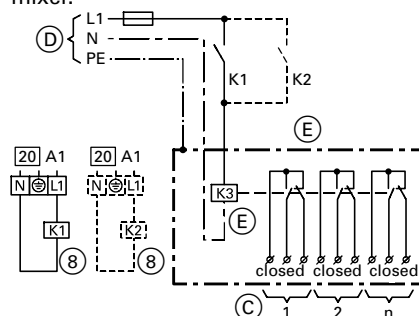
If there is no possibility of reducing the heat transfer to the heating circuits, e.g. in older systems, we would recommend that the boiler is connected in accordance with the examples on pages 34 to 39.

Advantages:

You will not need costly mixing valves to raise the return temperature.

Wiring diagram

Wiring for reducing the volume flow via the limit thermostat T1 in heating systems with heating circuit control units, which are not connected to the boiler control unit via the LON BUS. Coding required at every Vitotronic 100 (type GC1):
change "4C" to "2" – use the plug-in connector [20] A1 to close the downstream mixer.



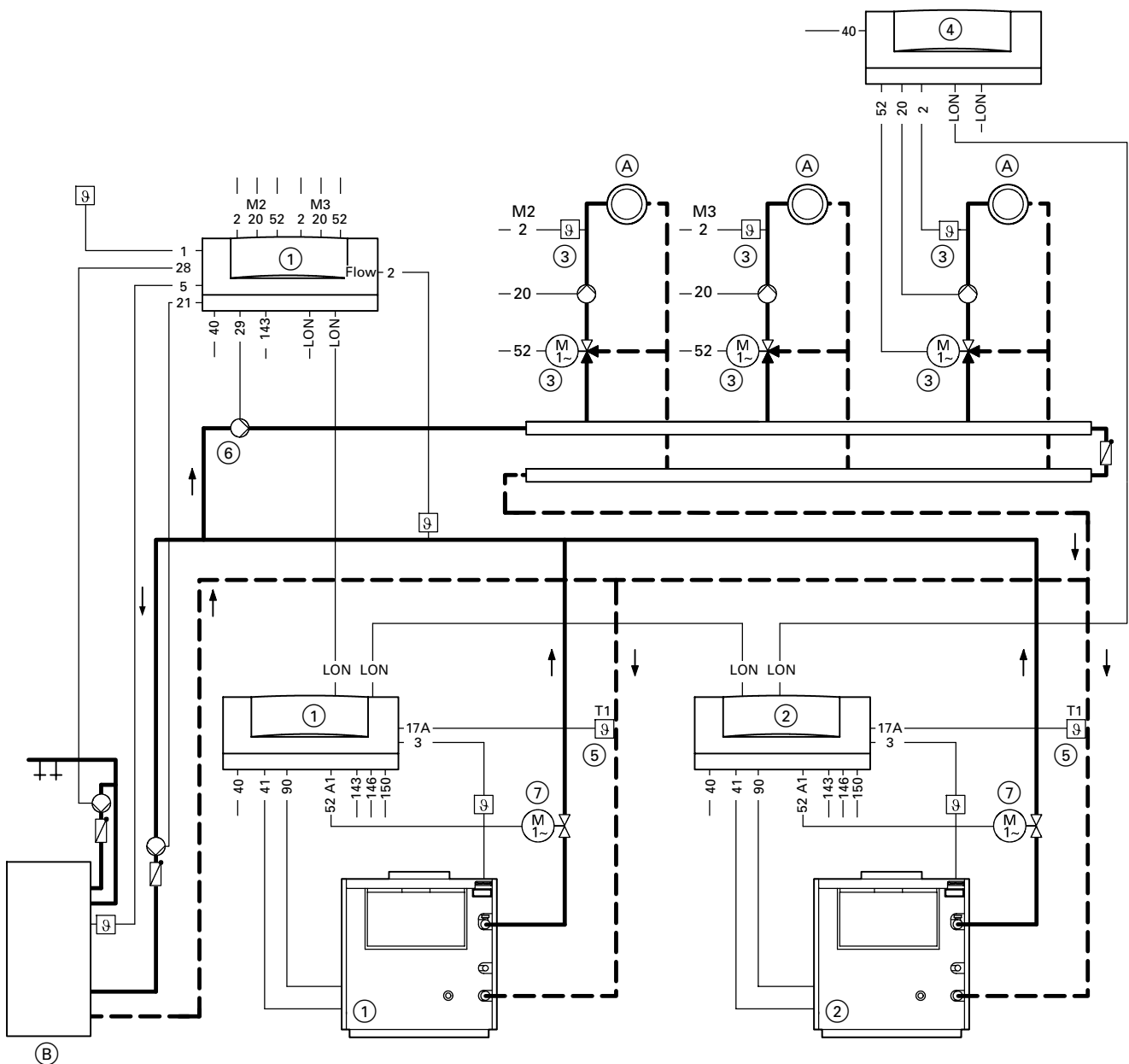
- [20] A1 Closing the mixer
Downstream heating circuit control unit contact closed: signal for "Close mixer"
- (D) Mains electrical connection, 230V~/50 Hz
- (E) Connection box, on site

The distributor pump and the motorised butterfly valve(s) must be connected to the external control unit, if an external cascade control unit is used.

Item	Description	Number	Part no.
①	Boiler with Vitotronic 100 and Vitotronic 333	1	as per price list
②	Boiler with Vitotronic 100	1 to 2	as per price list
③	Expansions for heating circuits with mixer with Vitotronic 333 and Vitotronic 050 – Extension kit for heating circuits with mixer or – Mixer motor for flanged mixer and plug-in connector and – Contact temperature sensor or – Immersion temperature sensor (incl. sensor well)	corresp. to heating circuits corresp. to heating circuits corresp. to heating circuits corresp. to heating circuits	7450 650 as per price list 7450 642 7450 641
④	Vitotronic 050 (communication module LON required)	corresp. to heating circuits	as per price list
⑤	Temperature sensor T1 (in conjunction with Vitotronic 100, type GC1) – Contact temperature sensor or – Immersion temperature sensor (incl. sensor well) or Limit thermostat T1 (in conjunction with Vitotronic 100, type KC2)	1 to 3 1 to 3 1*1	7450 642 7450 641 Z001 886
⑥	Distributor pump	1	on site
⑦	Motorised butterfly valve	1 to 3	on site
⑧	Contact relay	1 to 2	7814 681

*1Connect once to the main return line.

Installation diagram



Plug-in connector

1	Outside temperature sensor* ¹	20	M3	Heating circuit pump mixer* ¹	52	A1	Motorised butterfly valve* ²
2	Flow	20	M2	Heating circuit pump	52	M2	Mixer motor* ¹
2	M2	20	M3	Vitotronic 050	52	M3	Mixer motor* ¹
2	M3	21		Circulation pump for DHW cylinder heating* ¹	52		Mixer motor Vitotronic 050
2		28		DHW circulation pump* ¹	90		Burner (2nd stage)
3		29		Distributor pump* ¹	143		External hooking up* ¹
5		40		Electrical mains connection, 230V~/50 Hz	146		External hooking up* ¹ see from page 44
17	A	41		Install the mains isolator according to local regulations.	150		External hooking up, * ³ see page 43
20	M2			Burner (1st stage)	LON		Connection LON-BUS (free connection with terminal resistor)

- (A) Heating circuit with mixer
(B) Domestic hot water cylinder

*¹Only for Vitotronic 333.

*²Only for Vitotronic 100 (type GC1).

*³Only for Vitotronic 100 (type KC2).

3.1 Application example 10

Application example 10 - Multi-boiler system with Vitogas 100 boilers with distributor pump and injection circuit

System:

Multi-boiler systems with

- Vitogas 100 (72 to 144 kW)
- Vitotronic 100 (type GC1) for every boiler in the multi-boiler system and Vitotronic 333 (type MW1) one for the whole multi-boiler system

or

Vitotronic 100 (type GC1) for every boiler in the multi-boiler system with Vitocontrol control panel and integrated weather-compensated Vitotronic 333 (type MW1S) control unit

or

Vitotronic 100 (type KC2) and external, weather-compensated cascade control unit with DHW cylinder temperature control (for connections, see page 43)

- Vitotronic 050
- Distributor pump
- Injection circuit.

Possible applications:

If the distributor is located in remote sub-stations (> 20 m), and the heating circuits require heat immediately after a demand is created, e.g. blown air-heaters. The heat transfer to the heating circuits must be able to be reduced.

System-specific coding

On Vitotronic 333 change "4D" to "0" – use the plug-in connector [29] for the distributor pump. For every Vitotronic 100 (type GC1) change "0D" to "1" – T1 affects the heating circuit control unit.

Equipment required

(For standard systems – equipment with additional system modules, see Vitotec 2 folder)

Item	Description	Number	Part no.
①	Boiler with Vitotronic 100 and Vitotronic 333	1	as per price list
②	Boiler with Vitotronic 100	1 to 2	as per price list
③	Expansions for heating circuits with mixer with Vitotronic 333 and Vitotronic 050		
	– Extension kit for one heating circuit with mixer		
	or		
	– Mixer motor for flanged mixer and plug-in connector	corresp. to heating circuits	7450 650
	and	corresp. to heating circuits	as per price list
	– Contact temperature sensor	corresp. to heating circuits	7450 642
	or	corresp. to heating circuits	7450 641
	– Immersion temperature sensor (incl. sensor well)	corresp. to heating circuits	as per price list
④	Vitotronic 050 (communication module LON required)	corresp. to heating circuits	
⑤	temperature sensor T1 (in conjunction with Vitotronic 100, type GC1)		
	– Contact temperature sensor	1 to 3	7450 642
	or	1 to 3	7450 641
	– Immersion temperature sensor (incl. sensor well)		
	or		
	Limit thermostat T1 (in conjunction with Vitotronic 100, type KC2)	1*1	Z001 886
⑥	Distributor pump	1	on site
⑦	Motorised butterfly valve	1 to 3	on site
⑧	Contact relay	1 to 2	7814 681

*1 Connect once to the main return line.

Function description:

If the actual temperature falls below the required minimum return temperature, the temperature sensor T1 or the limit thermostat T1 reduces or closes the mixer.

Size the distributor pump to 110% of the total throughput capacity of the heating system.

The injection circuit provides heat at the consumers immediately upon demand. For this purpose, the 3-way mixer will be controlled.

If there is no possibility of reducing the heat transfer to the heating circuits, e.g. in older systems, we would recommend that the boiler is connected in accordance with the examples on pages 34 to 39.

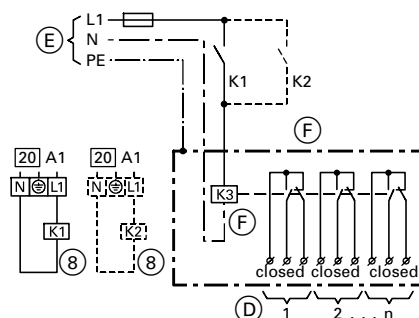
Advantages:

You will not need any shunt pumps or costly mixing valve to raise the return temperature. The boiler receives optimum protection when using Vitotronic 333 (type MW1) or if the heating circuits are controlled via a connected Vitotronic 050. No additional on-site protective measures are required.

Wiring diagram

Wiring for reducing the volume flow via the limit thermostat T1 in heating systems with heating circuit control units, which are not connected to the boiler control unit via the LON BUS.

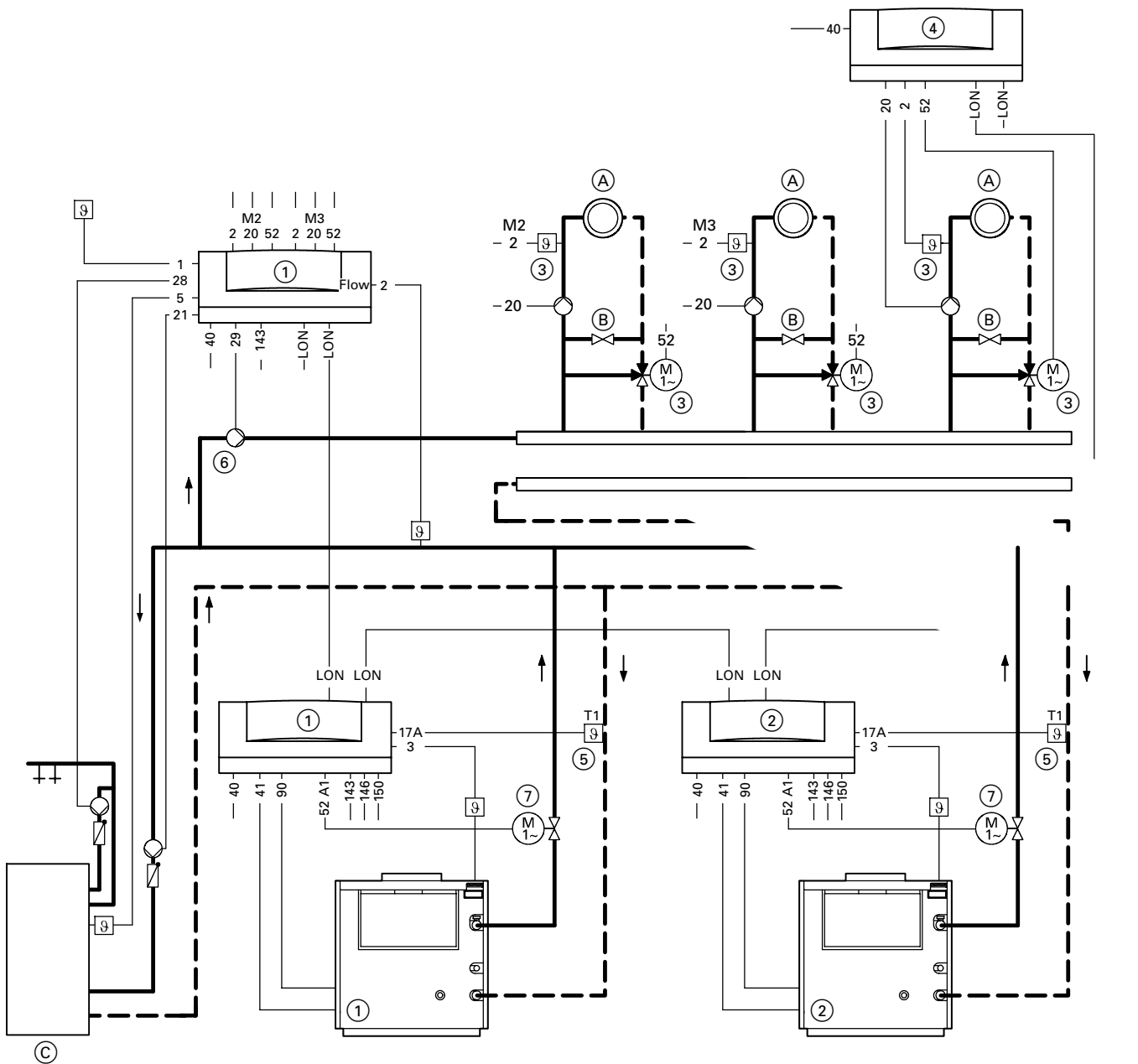
Coding required at every Vitotronic 100 (type GC1): change "4C" to "2" – use the plug-in connector [20] A1 to close the downstream mixer.



- [20] A1 Closing the mixer
- (D) Downstream heating circuit contact closed: signal for "Close mixer"
- (E) Mains electrical connection, 230V~/50 Hz
- (F) Connection box, on site

The distributor pump and the motorised butterfly valve(s) must be connected to the external control unit, if an external cascade control unit is used.

Installation diagram



Plug-in connector

1	Outside temperature sensor* ¹	20	M3	Heating circuit pump mixer* ¹	52	A1	Motorised butterfly valve
2	Flow	20		Heating circuit pump	52	M2	Mixer motor* ¹
	Flow temperature sensor, common heating system flow* ¹	20		Vitotronic 050	52	M3	Mixer motor* ¹
2	M2	21		Circulation pump for DHW cylinder heating* ¹	52		Mixer motor Vitotronic 050
2	M3	21			90		Burner (2nd stage)
2	Flow temperature sensor	28		DHW circulation pump* ¹	143		External hooking up* ¹
	Vitotronic 050	29		Distributor pump	146		External hooking up* ¹
3	Boiler temperature sensor	40		Electrical mains connection, 230V~/50 Hz	150		External hooking up, * ³
5	DHW cylinder temperature sensor* ¹	40		Install the mains isolator according to local regulations.			see page 43
17	A	41		Burner (1st stage)			Connection LON-BUS (free connection with terminal resistor)
20	M2						

(A) Heating circuit with mixer

(B) Injection circuit

(C) DHW cylinder

*¹Only for Vitotronic 333.*²Only for Vitotronic 100 (type GC1).*³Only for Vitotronic 100 (type KC2).

3.1 Application example 11

Application example 11 - Multi-boiler system with Vitogas 100 boilers and 3-way mixing valve for raising the return temperature

System:

Multi-boiler systems with

- Vitogas 100 (72 to 144 kW)
- Vitotronic 100 (type GC1) for every boiler in the multi-boiler system

and

Vitotronic 333 (type MW1) one for the whole multi-boiler system

or

Vitotronic 100 (type GC1) for every boiler in the multi-boiler system with Vitocontrol control panel and integrated weather-compensated Vitotronic 333 (type MW1S) control unit

or


Vitotronic 100 (type KC2) and external, weather-compensated cascade control unit with DHW cylinder temperature control (for connections, see page 43)

- Vitotronic 050
- and 3-way mixing valve for raising the return temperature.

Possible applications:

For example, older heating systems and/or systems, where downstream heating circuits cannot be controlled.

System-specific coding

at every Vitotronic 100 (type GC1) change "0C" to "1" – system with constant return temperature control for every boiler.
change "4D" to "2" – use the plug-in connector  for the boiler circuit pump.

Function description:

If this does not achieve the required minimum return temperature, the temperature sensor T1 closes the 3-way mixing valve in proportion and therefore ensures the boiler protection.

Boiler and downstream heating circuits are hydraulically coupled together. The flow temperature is controlled by the common temperature sensor.

Advantages:

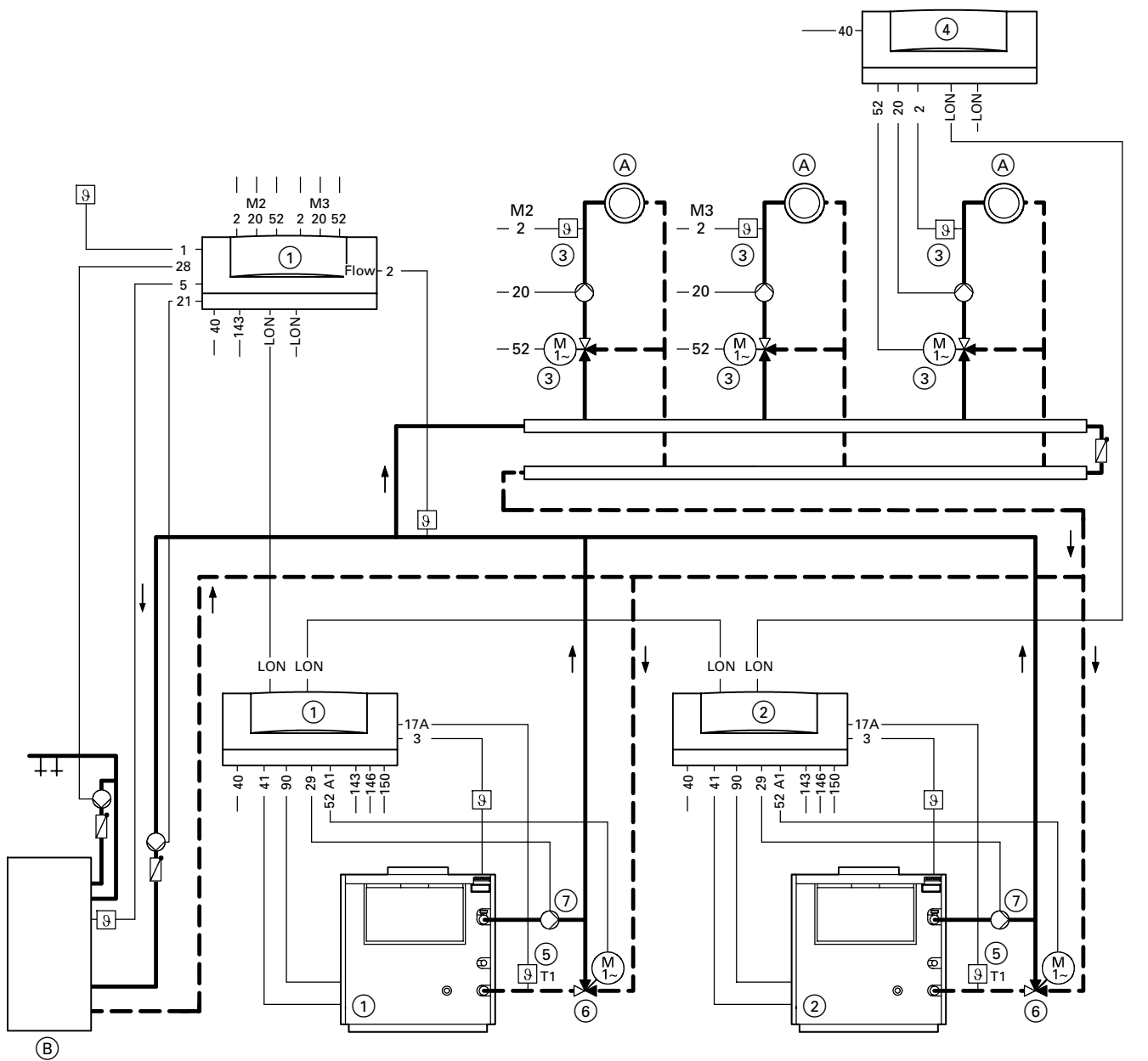
Proportional return temperature raising to protect the boiler. Boilers are protected against return temperatures which are too low, independent of the downstream heating circuits.

Equipment required

(For standard systems – equipment with additional system modules, see Vitotec 2 folder)

Item	Description	Number	Part no.
①	Boiler with Vitotronic 100 and Vitotronic 333	1	as per price list
②	Boiler with Vitotronic 100	1 to 2	as per price list
③	Expansions for heating circuits with mixer with Vitotronic 333 and Vitotronic 050		
	– Extension kit for one heating circuit with mixer	corresp. to heating circuits	7450 650
	or	corresp. to heating circuits	as per price list
	– Mixer motor for flanged mixer and plug-in connector	corresp. to heating circuits	7450 642
	and	corresp. to heating circuits	7450 641
	– Contact temperature sensor	corresp. to heating circuits	
	or		
	– Immersion temperature sensor (incl. sensor well)	corresp. to heating circuits	as per price list
④	Vitotronic 050 (communication module LON required)	corresp. to heating circuits	
⑤	Temperature sensor T1 (in conjunction with Vitotronic 100, type GC1)		
	– Contact temperature sensor	1 to 3	7450 642
	or		
	– Immersion temperature sensor (incl. sensor well)	1 to 3	7450 641
⑥	3-way mixing valve	1 to 3	on site
⑦	Boiler circuit pump	1 to 3	on site

Installation diagram



Plug-in connector

1	Outside temperature sensor* ¹	20	M3	Heating circuit pump mixer* ¹	52	A1	3-way mixing valve
2	Flow	20		Heating circuit pump	52	M2	Mixer motor* ¹
	Flow temperature sensor, common			Vitotronic 050	52	M3	Mixer motor* ¹
M2	Flow temperature sensor mixer* ¹	21		Circulation pump for DHW cylinder	52		Mixer motor Vitotronic 050
M3	Flow temperature sensor mixer* ¹			heating* ¹	90		Burner (2nd stage)
2	Flow temperature sensor	28		DHW circulation pump* ¹	143		External hooking up* ¹
	Vitotronic 050	29		Boiler circuit pump* ²	146		External hooking up* ¹
3	Boiler temperature sensor	40		Electrical mains connection,			see from page 44
5	DHW cylinder temperature			230V~/50 Hz	150		External hooking up, * ³
	sensor* ¹			Install the mains isolator according			see page 43
17 A	Temperature sensor T1* ²	41		to local regulations.	LON		Connection LON-BUS (free
20	M2			Burner (1st stage)			connection with terminal resistor)
	Heating circuit pump mixer* ¹						

- (A) Heating circuit with mixer
(B) Domestic hot water cylinder

*¹Only for Vitotronic 333.

*²Only for Vitotronic 100 (type GC1).

*³Only for Vitotronic 100 (type KC2).

3.1 Application example 12

Application example 12 - Multi-boiler system with Vitogas 100 boiler with low-loss header and 3-way mixing valve for raising the return temperature

System:

Multi-boiler system with

- Vitogas 100 (72 to 144 kW)
- Vitotronic 100 (type GC1) for every boiler in the multi-boiler system
and
- Vitotronic 333 (type MW1) one for the whole multi-boiler system

or

Vitotronic 100 (type GC1) for every boiler in the multi-boiler system with Vitocontrol control panel and integrated weather-compensated Vitotronic 333 (type MW1S) control unit

or

Vitotronic 100 (type KC2) and external, weather-compensated cascade control unit with DHW cylinder temperature control (for connections, see page 43)

- Vitotronic 050
- 3-way mixing valve for raising the return temperature
- Low loss header.

Possible applications:

For example older systems or system, where the hydraulic conditions cannot be clearly defined and/or systems, where downstream heating circuits cannot be controlled.

System-specific coding

at every Vitotronic 100 (type GC1)
change "0C" to "1" – system with constant return temperature raising for every boiler.
change "4D" to "2" – use the plug-in connector [29] for the boiler circuit pump.

Function description:

If the actual temperature falls below the required minimum return temperature, the temperature sensor T1 closes the 3-way mixing valve in proportion and therefore ensures the boiler is protected.

The flow temperature is controlled by the temperature sensor of the low-loss header.

Advantages:

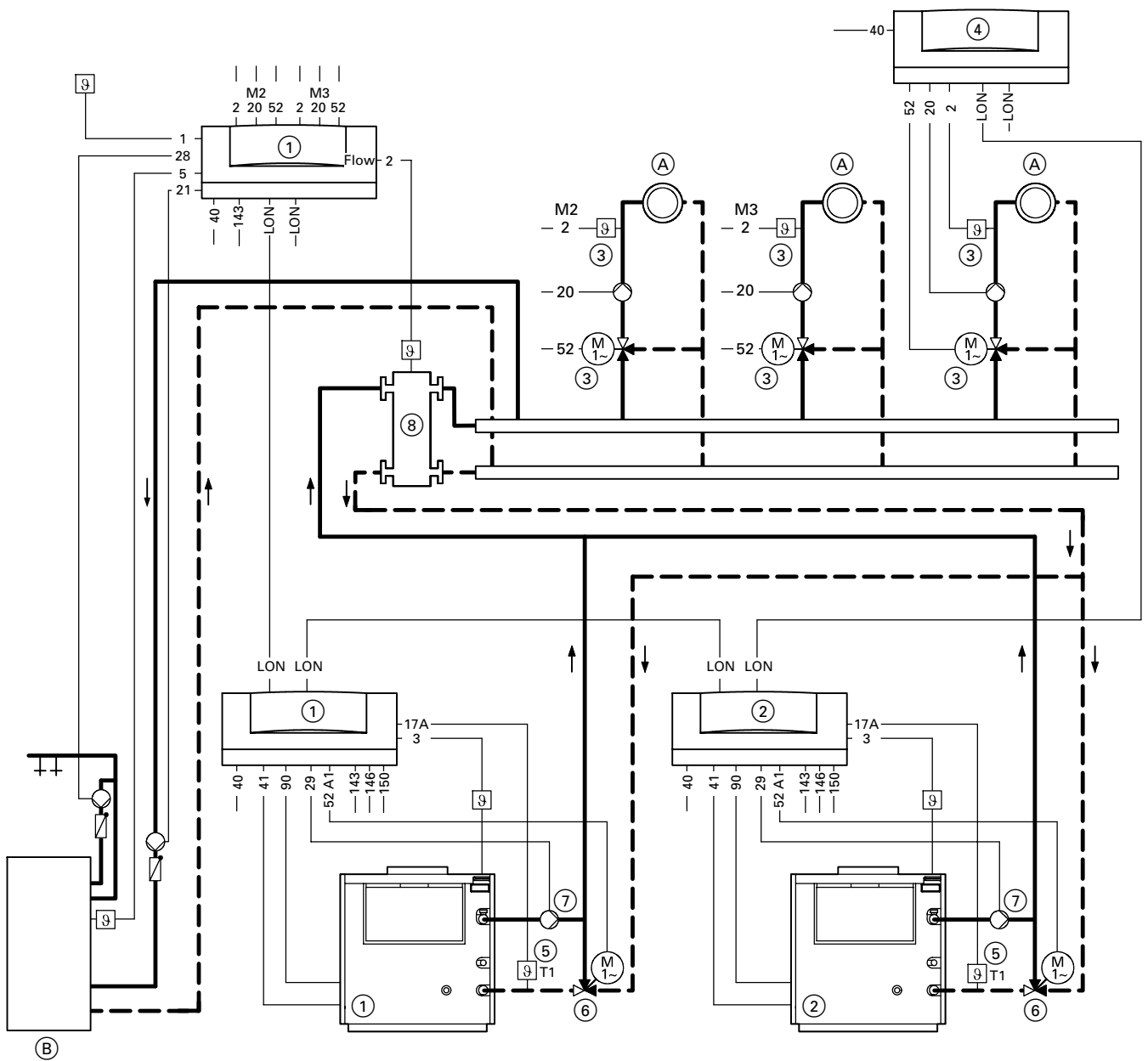
Boiler and downstream heating circuits are hydraulically coupled together. Proportional return temperature raising to protect the boiler. Boilers are protected against return temperatures, which are too low, independent of the downstream heating circuits.

Equipment required

(For standard systems – equipment with additional system modules, see Vitotec 2 folder)

Item	Description	Number	Part no.
①	Boiler with Vitotronic 100 and Vitotronic 333	1	as per price list
②	Boiler with Vitotronic 100	1 to 2	as per price list
③	Expansions for heating circuits with mixer with Vitotronic 333 and Vitotronic 050		
	– Extension kit for one heating circuit with mixer		
	or		
	– Mixer motor for flanged mixer and plug-in connector	corresp. to heating circuits	7450 650
	and	corresp. to heating circuits	as per price list
	– Contact temperature sensor	corresp. to heating circuits	7450 642
	or	corresp. to heating circuits	
	– Immersion temperature sensor (incl. sensor well)	corresp. to heating circuits	7450 641
④	Vitotronic 050 (communication module LON required)	corresp. to heating circuits	as per price list
⑤	Temperature sensor T1 (in conjunction with Vitotronic 100, type GC1)		
	– Contact temperature sensor	1 to 3	7450 642
	or		
	– Immersion temperature sensor (incl. sensor well)	1 to 3	7450 641
⑥	3-way mixing valve	1 to 3	on site
⑦	Boiler circuit pump	1 to 3	on site
⑧	Low loss header	1	on site

Installation diagram



Plug-in connector

1	Outside temperature sensor* ¹	20 M3	Heating circuit pump mixer* ¹	52 A1	3-way mixing valve
2	Flow temperature sensor, common heating system flow* ¹	20	Heating circuit pump Vitotronic 050	52 M2	Mixer motor* ¹
2 M2	Flow temperature sensor mixer* ¹	21	Circulation pump for DHW cylinder heating* ¹	52 M3	Mixer motor Vitotronic 050
2 M3	Flow temperature sensor mixer* ¹	28	DHW circulation pump* ¹	90	Burner (2nd stage)
2	Flow temperature sensor Vitotronic 050	29	Boiler circuit pump	143	External hooking up* ¹
3	Boiler temperature sensor	40	Electrical mains connection, 230V~/50 Hz	146	External hooking up* ¹ see from page 44
5	DHW cylinder temperature sensor* ¹		Install the mains isolator according to local regulations.	150	External hooking up, * ³ see page 43
17 A	Temperature sensor T1* ²	41	Burner (1st stage)	LON	Connection LON-BUS (free connection with terminal resistor)
20 M2	Heating circuit pump mixer* ¹				

- (A) Heating circuit with mixer
(B) Domestic hot water cylinder

*¹Only for Vitotronic 333.*²Only for Vitotronic 100 (type GC1).*³Only for Vitotronic 100 (type KC2).

3.2 Domestic hot water heating with cylinder loading system

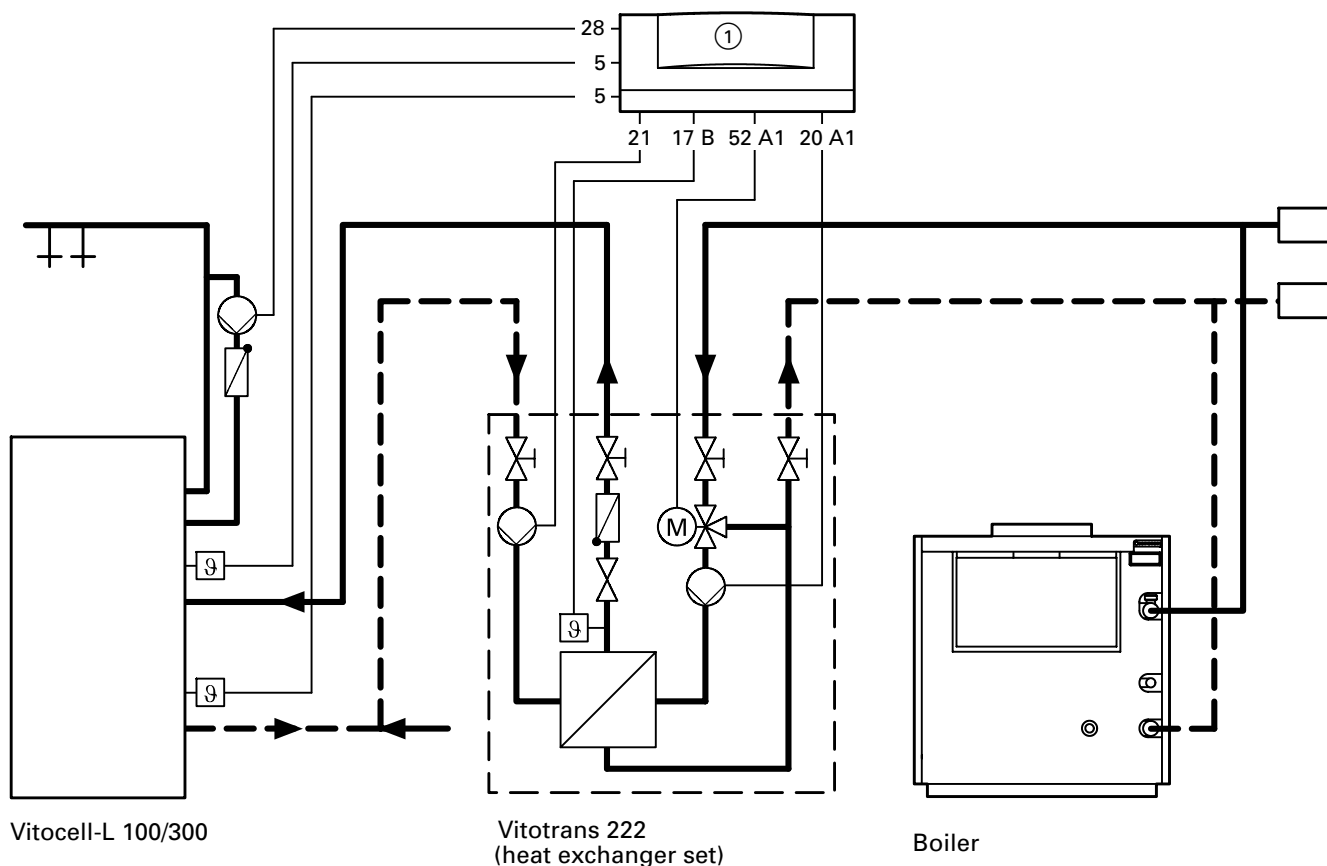
3.2 Domestic hot water heating with cylinder loading system

The Viessmann cylinder loading system is a combination of a Vitocell-L cylinder and a Vitotrans heat exchanger set. The cylinder loading system for DHW heating is a preferred choice for:

- large storage capacities with offset loading and drawing times, e.g. water is drawn off in bursts at schools, sports centres, hospitals, army camps, social buildings, etc.

- short-term peak loads, i.e. high draw-off rates and various re-heat times, e.g. domestic hot water heating in swimming pools, sports facilities, industrial companies, etc.
- limited space as the cylinder loading system can transfer a high output.

The DHW cylinder loading system can be ① controlled by a Vitotronic 100 (type GC1), 300 (type GW2) or 333. Control can be achieved via a mixer through Vitotronic 050 (type HK1W, HK1S, HK3W or HK3S), if these control units are not available or if there are several cylinder loading systems.



Plug-in connector

- 5 Cylinder temperature sensor (top)
- 5 Cylinder temperature sensor (bottom)
- 17 B Temperature sensor Vitotrans 222
- 20 A1 Primary pump connection in the cylinder loading system
- 21 Secondary pump connection in the cylinder loading system
- 28 DHW circulation pump (not for Vitotronic 100)
- 52 A1 3-way valve Vitotrans 222

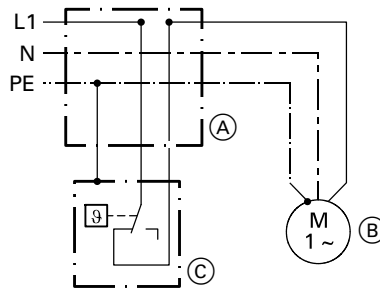
System-specific coding on Vitotronic ①

Change "4C" to "1" – use the plug-in connector 20 as primary pump for the heat exchanger set.
Change "4E" to "1" – use the output 52 as primary control unit for the heat exchanger set.
Change "55" to "3" – use the DHW cylinder thermostat for the heat exchanger set.

Notes regarding the application examples (chapter 3.1)

Application example 6

The sensor input **17** B is used to control the Vitotrans 222 heat exchanger set. Therefore, the shunt pump must be controlled by a separate thermostat (see figure adjacent).



- (A) Connection box, on site
- (B) Shunt pump
- (C) Limit thermostat, part no. Z001 886

Application example 7

A separate Vitotronic 050 must be used for controlling the Vitotrans 222 heat exchanger set. The Vitotronic boiler control unit affects the constant return temperature control.

Application examples 8 to 12 (multi-boiler systems)

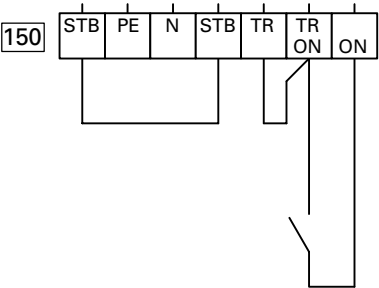
The Vitotrans 222 heat exchanger set is controlled by Vitotronic 333.

3.3 Installation notes

Connection of an on-site control unit to Vitotronic 100 (type KC2) – single boiler systems

Operation with a two-stage burner

Plug-in connectors inside the control unit



Volt-free contacts of the overriding control units:

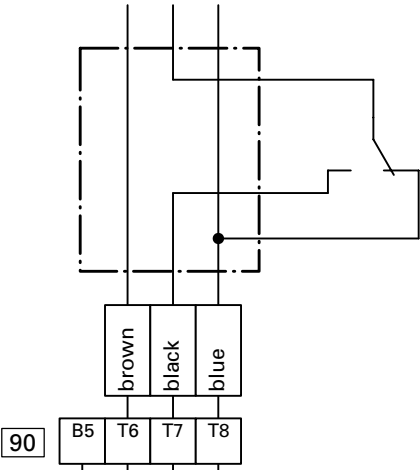
1st burner stage ON

Remove the wire jumper from the plug-in connector 103.

Settings on Vitotronic 100
The high limit safety cut-out settings and other settings depend on the system equipment and the safety equipment acc. to DIN 4751-2.

High limit safety cut-out	110 °C	100 °C
Control thermostat	100 °C	87 °C
Maximum temperature of the on-site control unit	95 °C	80 °C

Control unit cable
(plug-in adaptor 2nd stage)



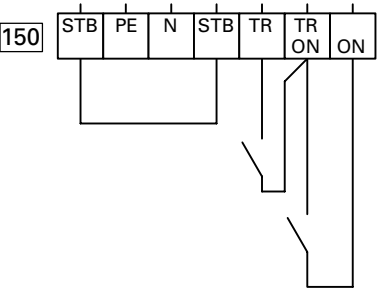
2nd burner stage ON
Connection to T8 = full load
Connection to T7 = partial load

Plug-in connector for Vitotronic 100 (type KC2) to the burner

Connection of an on-site control unit to Vitotronic 100 (type KC2) – multi-boiler systems

Operation with a two-stage burner

Plug-in connectors inside the control unit



Volt-free contacts of the overriding control units:

Enable boiler

1st burner stage ON

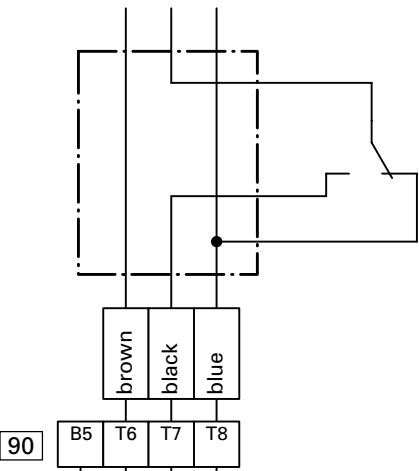
Remove the wire jumper from the plug-in connector 103.
The contact "enable boiler" must be constantly closed at the lead boiler and closed on demand at the lag boiler.

Settings on Vitotronic 100

The high limit safety cut-out settings and other settings depend on the system equipment and the safety equipment acc. to DIN 4751-2.

High limit safety cut-out	110 °C	100 °C
Control thermostat	100 °C	87 °C
Maximum temperature of the on-site control unit	95 °C	80 °C

Control unit cable
(plug-in adaptor 2nd stage)



2. burner stage ON
Connection to T8 = full load
Connection to T7 = partial load

Plug-in connector for Vitotronic 100 (type KC2) to the burner

3.3 Installation notes

Additional connection options

■ to Vitotronic 200 (type KW2)

Additional connections to Vitotronic 200 (type KW2) are possible in conjunction with the switching module V (part no. 7143 513) (see installation instructions for switching module V).

■ to Vitotronic 300 (type GW2) and Vitotronic 333 (type MW1)

External switch-on subject to load

When the volt-free contact between terminals "2" and "3" at the plug-in connection [146](#) closes, the boiler burner and possibly the burners of other boilers (via Vitotronic 333) may be switched on, subject to load.

The boiler water temperature is limited via the maximum set boiler water temperature or via the mechanical thermostat.
The set value is adjusted via coding "9B".

External blocking or mixer "close"

The burner is shut down or the mixer is closed when the volt-free contact between terminals "2" and "3" at the plug-in connection [143](#) closes. The boiler is excluded from the sequential control, the associated pumps are switched off and the shut-off equipment is closed.

Please note:
The frost protection of the boiler or heating circuit is no longer effective during the controlled shut-down or when the mixer "closes", i.e. the lower boiler water temperature and flow temperatures are no longer being maintained.

You can pre-select via coding "99", to which circuits input [143](#) will apply.






Coding "99"	Burner "off"	Heating circuit 1 (mixer circuit M1)	Heating circuit 2 (mixer circuit M2)	Heating circuit 3 (mixer circuit M3)
"0"				
"1"		x		
"2"			x	
"3"		x	x	
"4"				x
"5"		x		x
"6"			x	x
"7"		x	x	x
"8"	x			
"9"	x	x		
"10"	x		x	
"11"	x	x	x	
"12"	x			x
"13"	x	x		x
"14"	x		x	x
"15"	x	x	x	x

Change of external heating program/mixer open

Also applicable to Vitotronic 050

The manually pre-selected heating program can be changed or the connected mixer can be opened via the

volt-free plug-in connection ^[143]
terminals "1" and "2".

Manually pre-selected heating program (heating program with open contact)		Coding 2 enables changes after	<->	Changed heating program Changes can be made in all listed heating programs (heating program with closed contact)
 or	Room heating off/hot water off	D5 : 0 ("as delivered" condition)	<->	 Room heating off/hot water off
 or	Room heating off/hot water on	D5 : 1	<->	 Room heating constantly on/DHW on
	Room heating on/hot water on			

Code "91" enables the external heating program to be allocated to the individual heating circuits:

Coding "91"	Heating circuit 1 (mixer circuit M1 or directly connected heating circuit A1)	Heating circuit 2 (mixer circuit M2)	Heating circuit 3 (mixer circuit M3)
"0"			
"1"	x		
"2"		x	
"3"	x	x	
"4"			x
"5"	x		x
"6"		x	x
"7"	x	x	x

External mixer open

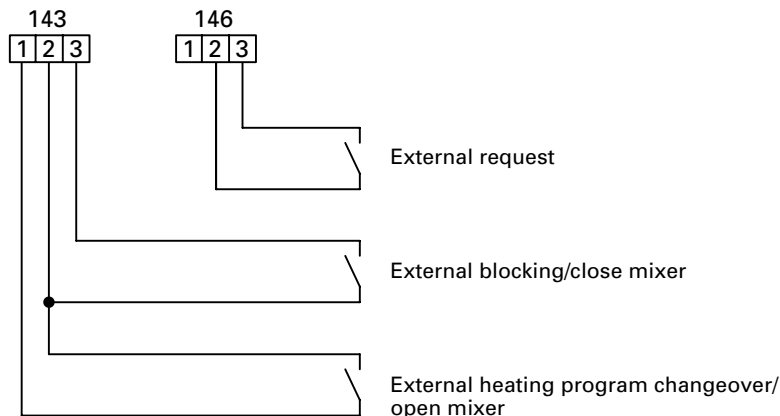
Code "9A" enables the external function "Mixer open" to be allocated to the individual heating circuits:

Code "9A"	Heating circuit 1 (mixer circuit M1)	Heating circuit 2 (mixer circuit M2)	Heating circuit 3 (mixer circuit M3)
"0"			
"1"	x		
"2"		x	
"3"	x	x	
"4"			x
"5"	x		x
"6"		x	x
"7"	x	x	x

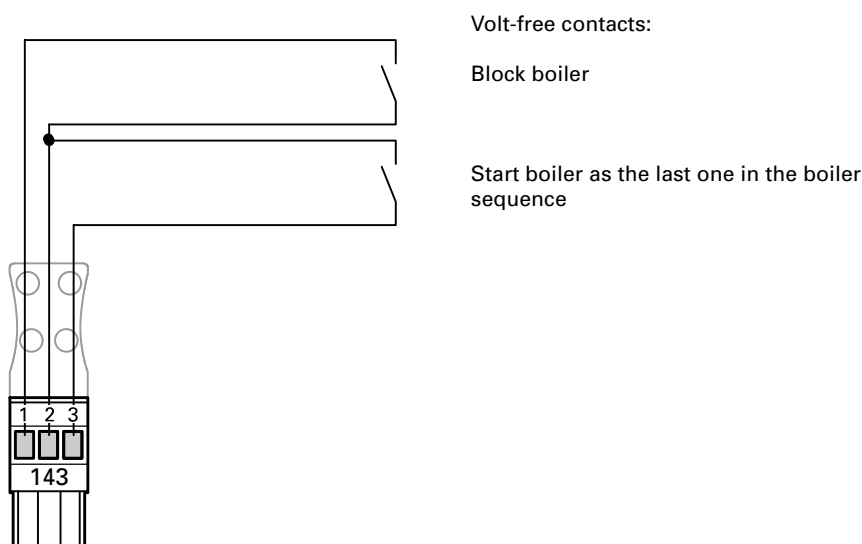
3.3 Installation notes

Connection to the external changeover facility

The connection is made on site via terminals "1" and "2" of the plug-in connector [146].



■ to Vitotronic 100 (type GC1) in conjunction with Vitotronic 333 (type MW1)



Block boiler

Connect the volt-free contact at terminals "1" and "2" of plug [143].

Contact closed:

The boiler is blocked. It is taken out of the boiler sequence, i.e. the butterfly valve or the 3-way mixing valve is closed for constant return temperature control and the shunt or boiler circuit pumps are switched off. The other boilers must provide the required heating.

Please note:

The heating system is **no** longer protected against frost if all boilers are blocked or there are no other available boilers.

Contact open:

The boiler is reinstated into the current boiler sequence.

Volt-free contacts:

Block boiler

Start boiler as the last one in the boiler sequence

Start boiler as the last one in the boiler sequence

Connect the volt-free contact at terminals "2" and "3" of plug [143].

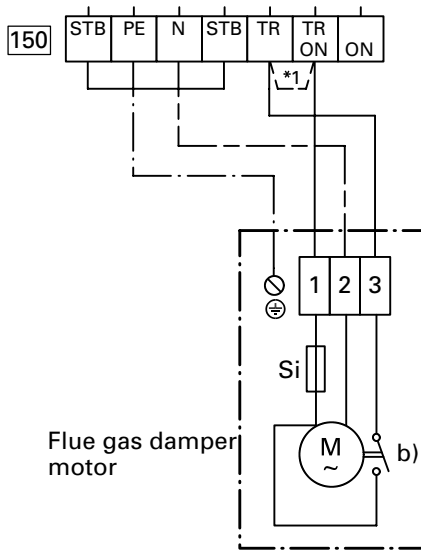
Contact closed:

The boiler is started as the last one in the boiler sequence. The heat demand of the heating system is being met by the other boilers. This boiler is started if the other boilers do not provide sufficient heat.

Contact open:

The boiler is reinstated into the current boiler sequence.

Electrical connection of a motorised flue gas damper



*1 remove the wire jumper

Plug-in adaptor for external safety equipment

Several additional pieces of safety equipment may be connected:

- Low water indicator
- Minimum pressure limiter
- Maximum pressure limiter
- Additional high limit safety cut-out and 3 external fault messages (e.g. pump or neutralisation system).

The plug-in adaptor enables faults to be displayed at the respective control unit and the transfer via communication equipment to mobile 'phones, fax or a control centre.

The respective fault can be displayed in plain text.

3.4 Hooking up on-site control equipment via LON BUS to Vitotronic 300 (type GW2) and Vitotronic 333 (type MW1)

Vitotronic control units are equipped with an open standard interface, i.e. the LON BUS (Local Operating Network). This universal, de-centralised network for automated building control systems not only allows communication between Vitotronic control units, but also the hooking up of on-site systems and devices of various manufacturers.

It enables, for example, individual room control units or building management systems to be directly connected to Vitotronic control units. Further modifications, expansions and maintenance work can be carried out at any time and with running systems.

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4.1 Index

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